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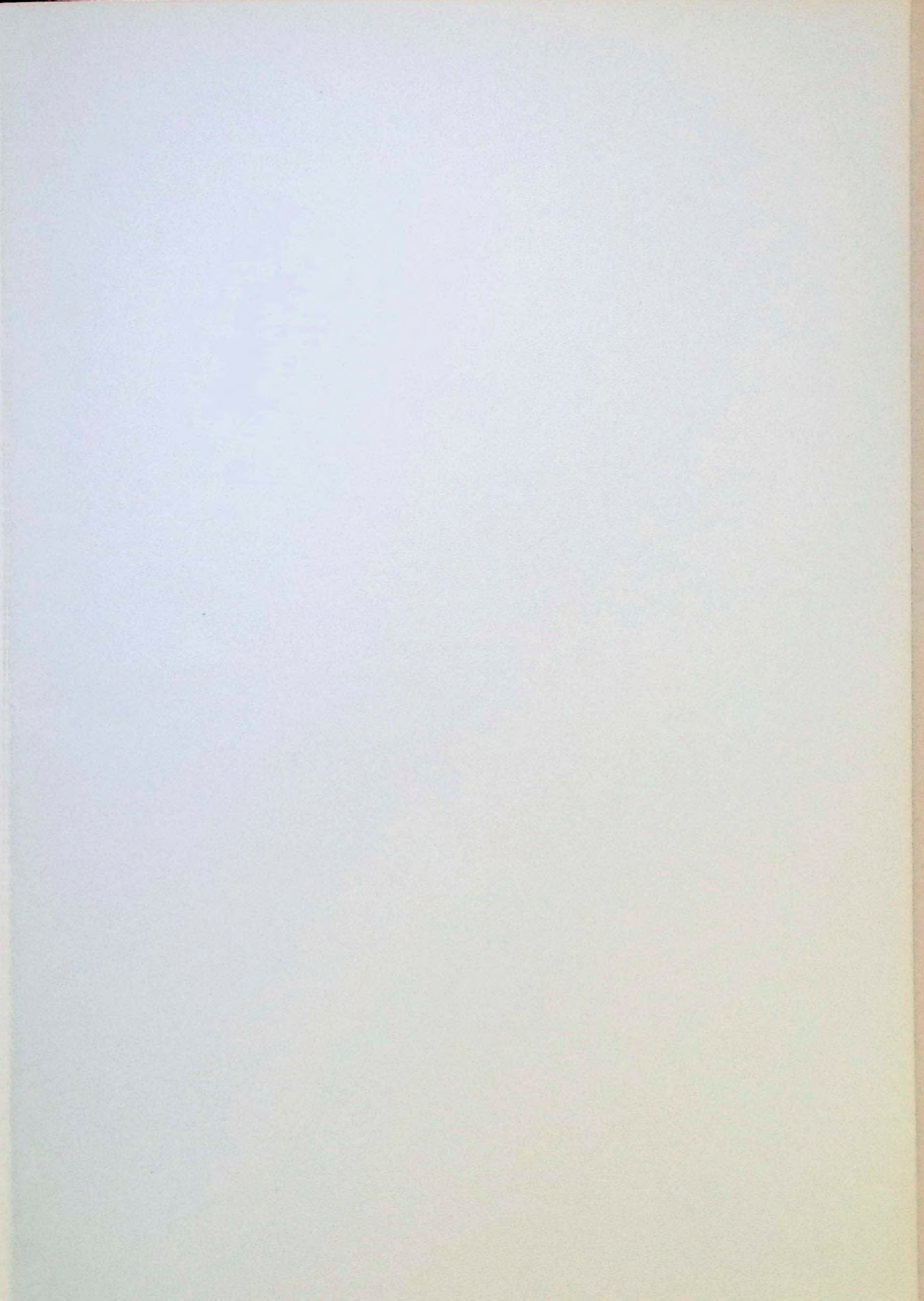
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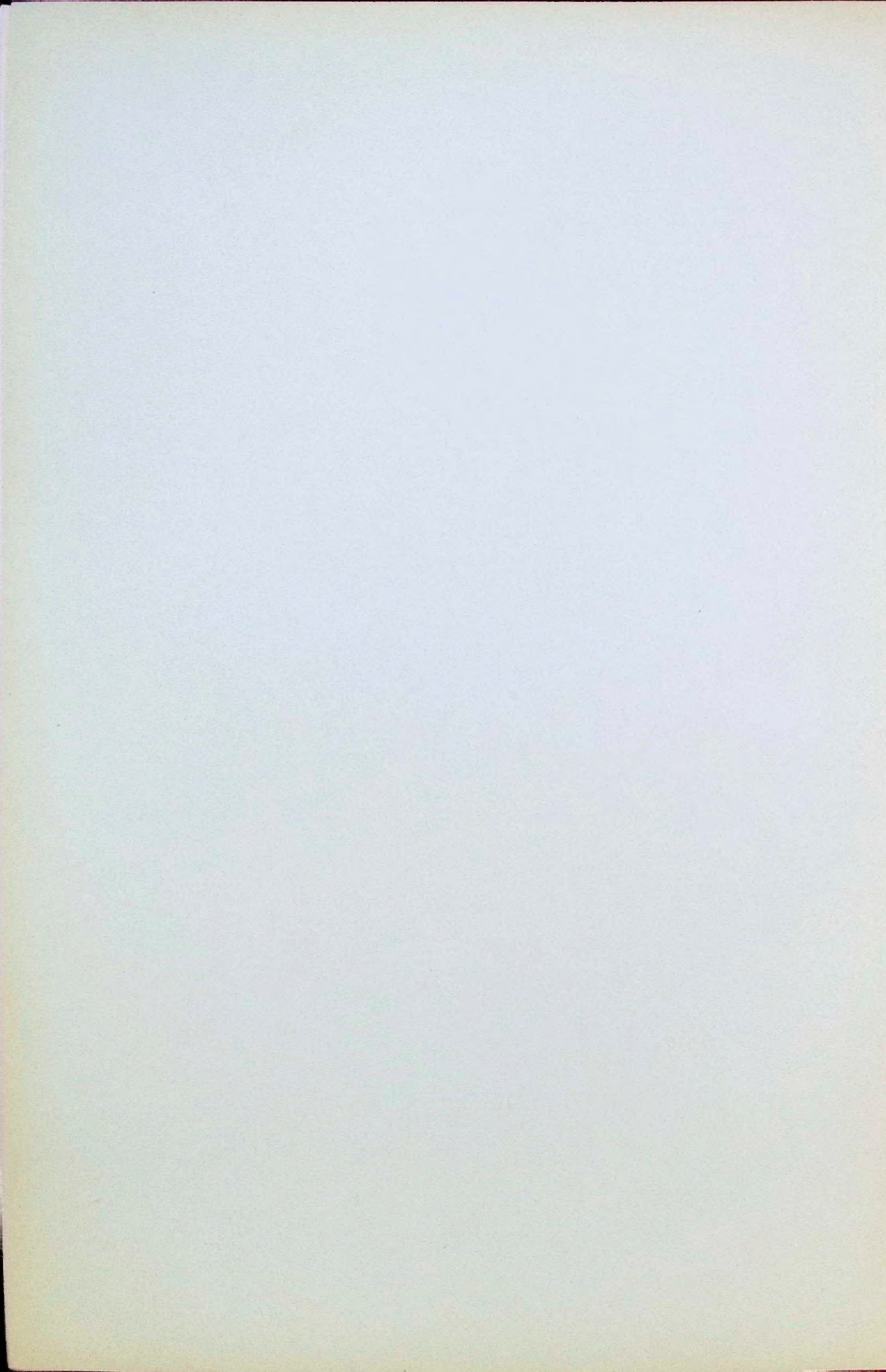
AN ARCHÆOLOGICAL ANALYSIS OF EASTERN
GRANT LAND, ELLESMERE ISLAND,
NORTHWEST TERRITORIES

By
Moreau S. Maxwell

1960

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Moreau S. Maxwell

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AN ARCHÆOLOGICAL ANALYSIS OF EASTERN GRANT LAND, ELLESMERE ISLAND, NORTHWEST TERRITORIES

INTRODUCTION

Northeastern Ellesmere Island, the land farthest north in the Queen Elizabeth Islands, has had a relatively short, but important role in Polar research and discovery. Members of the Nares Expedition of 1875-76 conducted the first exploration in the vicinity (Nares, 1878). H.M.S. *Discovery* spent that winter anchored in Discovery Harbour off Lady Franklin Bay, while H.M.S. *Alert* wintered in Lincoln Bay, 40 miles to the northwest. Lieutenants Archer and Conybeare of the *Discovery* explored and sounded the bays and fiords around Lady Franklin Bay, but this expedition made little penetration of the interior. Members of the Lady Franklin Bay Expedition, led by Lt. A. W. Greely (Greely, 1886), pushed inland from 1881 to 1883, discovering Lake Hazen and Greely Fiord of western Ellesmere Island. Robert E. Peary spent the winter of 1900-01 in Greely's old winter quarters at Fort Conger and foraged for muskoxen (Peary, 1903). In 1905, Peary returned to the region, wintering at Cape Sheridan on the north shore, and imported nearly one-third (seventy Polar Eskimos) of the residents of the village of Etah, Greenland, to hunt and drive dog teams (Peary, 1907). Twenty of these Eskimos established living quarters in the Lake Hazen vicinity and sledged muskox meat overland the 80 miles to Peary's quarters. On the return south in August, 1906, eight Eskimo families became dissatisfied with the food rationing and left the ship in Lady Franklin Bay. They are said (Steensby, 1910, p. 266) to have spent a second winter in the vicinity of Lake Hazen and in the spring journeyed over the sea-ice to Etah, where Knud Rasmussen found them, shortly after their arrival, in good physical condition. A shortage of dogs had forced them to make much of their trip on foot.

Peary brought Eskimo hunters into the Lake Hazen area again in the winter of 1908-09 (Peary, 1910). At approximately the same time, Cook was introducing the Polar Eskimos to the rich hunting grounds of western Ellesmere, discovered at the turn of the century by Sverdrup (Sverdrup, 1918). W. E. Ekblaw crossed the Hazen Valley from west to east in 1915, leaving Lake Hazen via the Ruggles Valley (MacMillan, 1918). In 1935 the area was revisited by members of the Oxford University Ellesmere Land Expedition (Moore, 1936). A. W. Moore, H. W. Stallworthy, and two Polar Eskimos sledged from Etah to Fort Conger, and inland to Lake Hazen where Moore and one Eskimo pushed up the Gilman Glacier into the interior of Grant Land.

In spite of these and later sporadic visits by icebreaker and aircraft to the general area, the first serious exploration since Greely's time commenced in 1957 under the sponsorship of the Defence Research Board (Defence Research Board, 1958). This expedition under Dr. Geoffrey Hattersley-Smith consisted of eight scientists who explored the area from late April to mid-August. They were followed by four members of the McGill University Geography Department who wintered-over at Lake

Hazen, taking meteorological observations. The Defence Research Board expedition, part of the Canadian IGY program, resumed in 1958, again under the leadership of Dr. Hattersley-Smith. This expedition consisted of eighteen scientists including the author.

Only a few of these earlier expeditions are significant from the archaeological viewpoint. E. H. Feilden, naturalist on the Nares Expedition, reports finding the framework of a large sledge, a stone lamp in good preservation, and a snow scraper made of walrus tusk from Cape Beechy, north of Lady Franklin Bay, along the west coast of Robeson Channel (Nares, 1878, Appendix 1, Number 1). Members of the Greely Expedition (Greely, 1886, 1888), and particularly Lt. Greely and Sgt. Brainerd, located many Eskimo sites in the vicinities of Lady Franklin Bay and Lake Hazen. Unfortunately, they boxed up the artifacts from these sites and left them at Fort Conger when the expedition retreated southward, and they are now lost. Many of the more significant finds were illustrated, including one engraving of an apparent Dorset harpoon head from Basil Norris Bay, which has been compared to material from the Dorset house directly across Hall Basin in Washington Land, Greenland (Mathiassen, 1928).

It was mainly on the basis of Greely's findings that Steensby (Steensby, 1910) in 1910 postulated the initial migration of an early, inland-oriented, muskox-hunting people into western Greenland via the Hazen Valley. He thought this migration must have been early since the Polar Eskimo of Smith Sound when discovered by Ross in 1818 (Ross, 1819) believed that there were no other people to north or south of them. Later excavations, pointing to prehistoric waves of migration and diffusion from Alaska, added to the theory, and most Arctic archaeologists virtually accepted as fact a peopling of northwestern Greenland through the Hazen Valley migration route. Eigil Knuth's recent find of a Cape Denbigh-like, proto-Dorset assemblage in northeastern Greenland (Knuth, 1952, 1954) and recognition of an early assemblage at Sarqaq in Disko Bay (Meldgaard, 1952) lent further weight to the postulated early migration route.

In the 1957 Defence Research Board Expedition, the discovery of additional habitation sites in the Lake Hazen-Lady Franklin Bay region by Drs. Hattersley-Smith, Roger Deane, and Robert Christie intensified the need for an archaeological survey, and the Human History Branch of the National Museum of Canada was asked to send a representative on the 1958 expedition.

ACKNOWLEDGMENTS

Field work in the Arctic, more than in any other area, depends upon the co-operative efforts of many people, and my debt of gratitude to those who made this analysis possible is great. The Board of Trustees of Michigan State University, Dr. Rollin Baker, Director of the Michigan State University Museum, and Dr. John Useem, Head of the Department of Sociology and Anthropology, generously granted me leave of absence for the field work, and sufficient time and laboratory facilities on my return for the preparation of the report. Members of the Human History Branch, and in particular Mr. William E. Taylor, Jr., and Dr. Richard S. MacNeish did an excellent job of outfitting me for the field and briefing me on Arctic archaeology. I have the utmost respect and appreciation for the far-sighted manner in which the Defence Research Board, De-

partment of National Defence, Canada, handled the complicated logistic problem, and in particular for the skill of the expedition leader, Dr. Geoffery Hattersley-Smith, and his appointed lieutenants, in creating a completely research-oriented field situation with a minimum of house-keeping detail. Each member of the eighteen-man scientific team contributed in some degree to the archæological analysis. In this, as in all the disciplines represented, friendly co-operation and mutual research interests made for a most happy summer. My particular gratitude for assistance goes to Dr. John Tener, Mr. David Ingle Smith, Mr. J. R. Weber, Mr. Ian McLaren, and Prof. R. E. Deane. My debt to Dr. Robert Christie and Mr. Barry Walker is obvious throughout the body of the report, and my gratitude goes to Mr. Henry Klippell for the photographic plates and to Mrs. Lorene Howe for the generous use of her time in typing the manuscript.

I had not counted on aerial reconnaissance; therefore, it is with particular pleasure that I thank Dr. Terris Moore for flights in his light plane and Lt. Al. Stigle, Lt. (jg) John Leese, and Lt. (jg) Charles Le Boeuf for flights in U.S. Navy helicopters. The season was brought to an easy end by the efficient manner in which LCDR. J. P. Croal (RCN) handled the complicated evacuation, and by the friendly hospitality with which we were received aboard the U.S.S. *Atka* by CDR. Reinhardt (USN), his officers, and crew.

SCOPE OF THE RESEARCH

The purpose of the 1958 field season can be simply stated: to cover as much terrain as could be carefully explored for evidence of habitations, and to excavate sample areas in as many sites as feasible. Throughout the field season we had to make compromises between scientific desires and geographic expediency since certain areas are accessible only under the proper weather conditions. But even under these circumstances we explored all logical camp-sites between the western end of Lake Hazen and the shores of Lady Franklin Bay.

Dr. Robert L. Christie and Mr. Barry Walker, both of the Geological Survey of Canada, and I left base camp on the northern shore of Lake Hazen on the 4th of June, proceeding across the frozen lake and down the Ruggles Valley by dog sled. At this time a thin snow mantle covered the land, but stone features more than 10 inches high showed above the surface. We located several tent-rings and caches along the route, which we explored more carefully later in the season.

Christie and Walker left me on the delta of a creek that enters Conybeare Bay south of Miller's Island at what had appeared to be the most extensive habitation site on our trek, and proceeded with the dog team to Cape Baird and the Judge Daly Promontory. Although their mission was a geological survey, they performed valuable archaeological service in locating, describing, and mapping sites along their route of march. Upon their return on the 25th of June, we crossed Conybeare Bay. The winter ice was then covered with melt-water. We cached the dog sled in Sun Bay, explored this vicinity and the west end of Discovery Harbour, then proceeded on foot up Black Rock Vale to the east end of Lake Hazen and across the frozen lake to base camp.

On the 1st of July I again crossed the frozen lake and started excavating the site at the head of Ruggles River, but the ice along the south shore began to deteriorate so rapidly in a day-long warm rain that I became worried about being isolated for the remainder of the season and walked back to base camp the following day. That night Dr. Christie, Mr. Walker, and I travelled by tractor and Greenland sled to the east end of the lake, the final trip of the season on the lake-ice. From here the two geologists walked overland to Alert, exploring the low valleys and plateaux between the lake and the northern coast, while I explored and excavated sites on the north shore as far west as the "Gilman River" and on the south shore as far as the Ruggles River. On the 24th of July, Dr. Roger Deane and Mr. Ian McLaren succeeded in forcing two small boats along a shore lead to pick us up at the east end of the lake. In returning to base camp we found that a wind shift had closed this lead, and we had to cache one of the canoes along the shore and man-haul the other over the candled lake-ice. Laborious as this chore was, it enabled me to complete an on-foot survey of the north shore as far west as the base camp. Two days later, Dr. Christie and I returned to the cached canoe and followed a shore lead to the west side of the Gilman delta where we excavated for two days. Then, crossing the lake

at the east end we proceeded to the head of Ruggles River where he left me to continue my excavation of this site. Meanwhile, other members of the expedition, ranging over the foothills of the north shore of Lake Hazen, had located additional sites. Mr. C. R. Harrington located a previously unsuspected site of 14 tent rings 3 miles inland from the shore. He also searched unsuccessfully for tent rings in the valley 10 miles west of the lake. Fortunately, and completely unexpectedly, Dr. Terris Moore, who had flown his Piper Super Cub from Ottawa to Lake Hazen, arrived at my isolated Ruggles River camp on the 8th of August. He flew me over Mr. Harrington's find and, later, on a complete low-level reconnaissance of the lake periphery. On the 13th of August, I was picked up from the Ruggles camp by helicopter from the U.S.S. *Atka* and flown to the site of the 14 rings on the plateau north of the lake and then back to base camp. We left base camp on August 14 and proceeded to Thule via ice breaker, pausing on the 16th and 17th at Polaris Promontory, Greenland, to assist Eigil Knuth in his excavation of a paleo-Eskimo site directly across Hall Basin from Lady Franklin Bay. This fortuitous combination of means of transportation, plus the willing and observant help of other scientists on the expedition enabled us to cover an unusual amount of terrain in the single field season.

GEOGRAPHICAL ENVIRONMENT¹

From Lake Hazen southeastward to the sea-coast the topography is dominated by the underlying "Cape Rawson group of tightly folded, slightly metamorphosed grits, slates, sandstones, quartzites, and greywackes of probable early Paleozoic age or older" (Defence Research Board, 1958, p. 16). "South of the lake a plateau rises gently from an elevation of 500 feet above sea-level at Lake Hazen to approximately 2,700 feet in the fiord area 25 miles to the south. This plateau presents an even skyline but is locally irregular and dissected by numerous streams" (*ibid.*, p. 19). Most of the fiords and bays are bordered by precipitous talus slopes rising 1,000 to 2,000 feet with very narrow foreshores. During the melt season, dangerous rock-slides down these slopes are almost continuous. In a few places, streams cut the steep shore and form small alluvial fans at sea-level.

The Cape Rawson beds produce thin slabs of frost-split sandstone and slate, which are excellent for Eskimo construction. Wherever the flat rock slabs and relatively level alluvial fans coincide there are traces of habitation. On the other hand, some otherwise ideal deltas and fans were not used, probably because of an absence of suitable building stone. Ida Bay at the west end of Conybeare Bay and "East Wind Bay" due north of the Tent Ring Site are both ideal camp-sites, with quantities of drift-wood in Ida Bay, but silts cover the shores, and boulders or flat slabs on the surface are few. The low terrain between Sun Bay and the west end of Discovery Harbour has many level sites, but there are not enough rocks on the surface to hold down a small tent.

¹ Since preparation of this report the preliminary reports of the Operation Hazen 1957-58 season have appeared in print (Defence Research Board, 1959) with important geographical, geological, biological, and botanical data on the region.

The south shore of Lake Hazen has fewer desirable camp-sites than the north shore. Along the south shore, and extending for about 6 miles northeastward of the lake, the bed-rock is covered by an unstable mantle of silt, which in many places lies on top of a 2- to 20-foot layer of clear ice. During the melt period, the silt and ice bluffs along the lake shore slough off, occasionally exposing outcrops of slate and sandstone. Such conditions account for the few habitation sites along the south shore. The foothills north of the lake rise abruptly from the shore, except where the streams and rivers have formed deltas at lake level. Most of the camp-sites on the north shore are located on these deltas.

CLIMATE

In the Lake Hazen region, the sun remains below the horizon continuously from October 14 to February 28, and above the horizon continuously from April 10 to September 6. The climate is arid. In the period of August 1957 to July 1958, 0.98 inch of precipitation was recorded (Climatological data furnished by McGill University, Department of Geography), of which 0.07 inch was rain. It is generally calm, with moderate summer temperatures (mean for July 1958, 43.9°F., maximum 59.2°F.) and very cold winter temperatures. In the winter of 1957-58 the December mean temperature was -47.7°F., maximum low temperature was -62.9°F., and high was -20.2°F. Maximum low for the winter was -68.5°F. in January, and in the months of November, December, February, and March the temperature did not rise above -3.4°F. These temperatures are considerably below comparable recordings at the sea-level stations of Alert and Eureka, indicating a probable accumulation of cold air in the Hazen Basin during the winter. Somewhat warmer winter temperatures would be expected in the Lady Franklin Bay region. Local climate appears to be quite critical. For example, in both winter and summer there is an almost constant wind blowing up the Ruggles Valley from Chandler Fiord. The force of this draft quickly dissipates in a fan of drifted snow, or in summer in a riffle of choppy water, about 200 yards from the head of the river. This spot also appears to have a higher rainfall than the north shore.

SNOW AND ICE CONDITIONS

Snow-cover seldom exceeds 12 inches; and since there is little wind, only slight drifting occurs, except in some of the smaller valleys. The lack of wind also means that there is less compacted snow suitable for snow-block building, although small blocks can be cut from the surface of Lake Hazen late in the year. Wide-runner sledging conditions are good throughout the region, although some of the bays are filled with old chunks of rafted ice and small bergy bits. In the middle of winter, Robeson Channel and Hall Basin are usually filled with rough ice with some open cracks, but they can be crossed by sledge. Umiak and kayak travel would be difficult even in July and August when ice-cover is seldom less than five-tenths and often may be locally nine-tenths or more. The fiord ice is usually more than 60 inches thick in late spring, but occasional open cracks,

running from shore to shore, afford breathing holes for seals. At Lake Hazen the hard lake-ice varies from 48 to 63 inches thick, making ice-fishing difficult. But fortunately, a large area at the head of Ruggles River is open even in the middle of winter, affording an excellent spot for catching Arctic char.

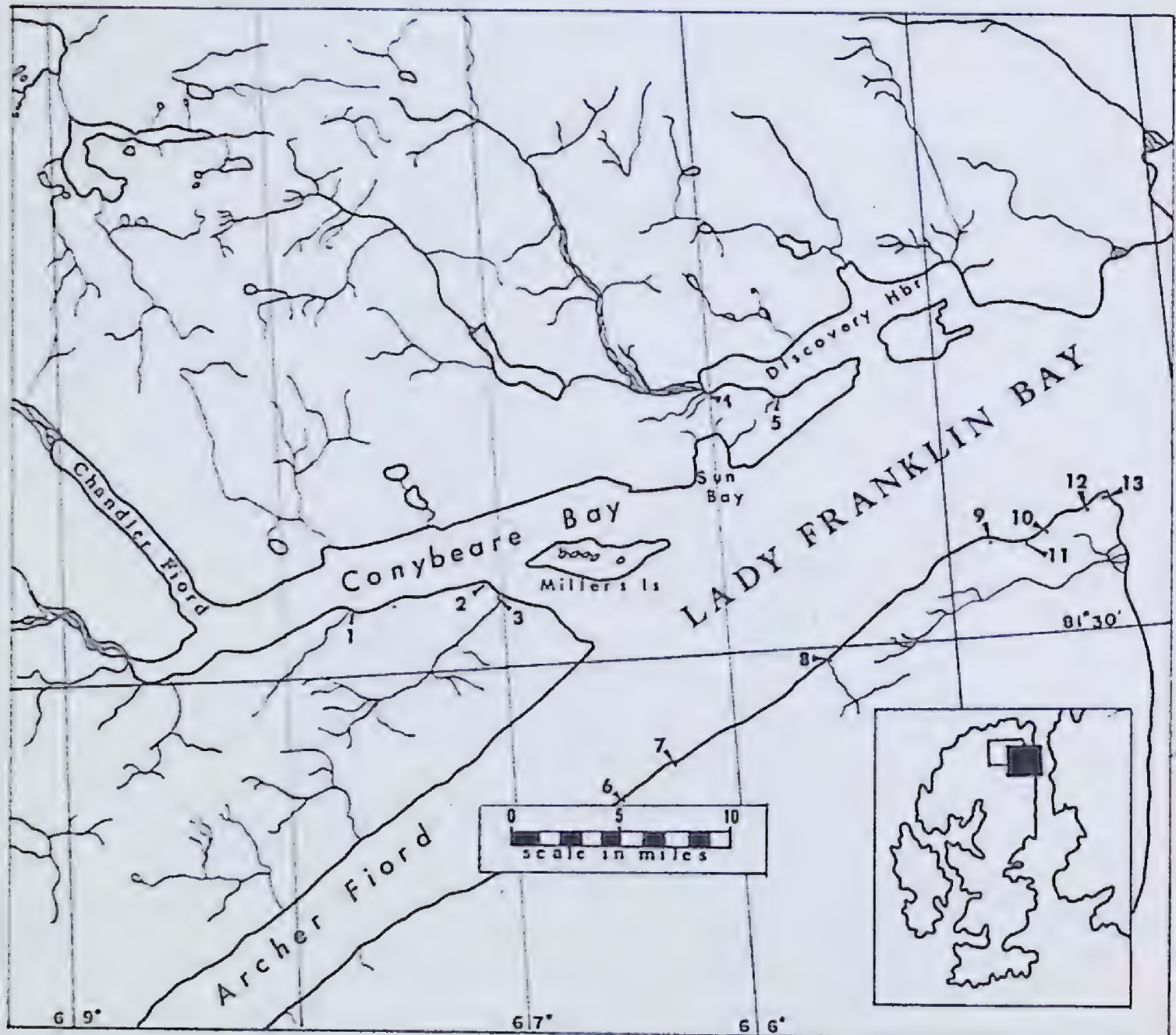
AVAILABLE RESOURCES

The local rock, as has been discussed, furnished large, flat slabs, excellent for sleeping platforms, floors, and roofs. Sharp quartz crystals weather out of the Cape Rawson quartzite, and a low-grade chert is available throughout northeastern Ellesmere, with an excellent glacial-gravel chert on the Polaris Promontory terraces less than 40 miles away. The local flora contributed little to Eskimo economy. There is hardly enough turf to use for building, although the floors and sleeping platform of at least one house were lined with moss. The creeping Arctic willow was used occasionally in open fireplaces, and its bark may have furnished anti-scorbutic properties. Driftwood was unusually abundant. Basil Norris Bay, at the west end of Discovery Harbour, and Ida Bay both trap quantities of driftwood ranging in size up to large stumps and telegraph-pole-sized logs. In most of the houses, this normally precious commodity was used for fuel. Thick coal seams have been located in both the Lady Franklin Bay and Lake Hazen regions, but there is no archaeological evidence that the Eskimos used coal. The Eskimos did collect and make beads of the amber nodules which weather out of the Lake Hazen coal seams and wash up on the beach at the east end of the lake.

There are probably few sea mammals. A few harbour, ringed, and bearded seal have been seen, and their bones appear in some numbers in the middens. Narwhal have been reported, but aside from tusks, no narwhal bones were found in the middens. No walrus bones were found, nor have any walrus sightings been reported. Polar bears are undoubtedly scarce, but they have been seen in the vicinity. In 1958, tracks in the snow were seen in Clements Markham Inlet on the north coast and on Polaris Promontory, Greenland. Their bones appeared in middens on Conybeare Bay, and in the meat caches adjoining the Dorset house on Polaris Promontory. Although fish spears were found in the sea-coast sites, there were no fish bones in any of the sea-coast middens. In Lake Hazen, however, the Arctic char was caught in large numbers.

Non-marine fauna is plentiful. Caribou are now apparently scarce. Greeley saw none in 1881-84; Peary saw a few near the northern shore, and members of the 1958 expedition saw four. In all of the Eskimo middens, however, caribou bones and antlers indicate their role as a major item of diet. Arctic hare, fox, and lemming are common, as are the Ptarmigan, Eider Duck, Oldsquaw, Red-throated Loon, and Snow Goose. In 1957-58, wolves were a considerable nuisance, and although their bones do not appear in the food middens, they must have been a similar problem to the Eskimo judging from the size and stability of their stone meat-caches. The most important food animal in terms of bulk is the muskox. Muskoxen bones were found in all of the middens, both on the fiords and along the

lake, and on the earliest house floors. In 1881 Greely estimated the local herd to be about 200. In spite of extensive slaughter of hundreds of these animals by explorers, there is still a herd of about 200 in the vicinity. All the evidence suggests that it was the muskox, and possibly the caribou, that lured the prehistoric Eskimo to this region.



MAP. 1. Location of sites in the Lady Franklin Bay Region. (The black square on the inset map indicates the position of this map in relationship to Ellesmere Island and northwestern Greenland.)

- | | |
|-----------------------------------|-------------------------------------|
| 1. Tent Ring Site (TjAr-1) | 7. Archer Fiord Two Site (TiAq-1) |
| 2. Stone Lamp Site (TjAq-2) | 8. Archer Fiord Three Site (TiAp-1) |
| 3. Lonesome Site (TjAq-1) | 9. Hematite Site (TjAo-1) |
| 4. Basil Norris Site (TkAp-1) | 10. Cape Baird One Site (TjAo-2) |
| 5. Eleanor Site (TkAp-2) | 11. Cape Baird Two Site (TjAo-3) |
| 6. Archer Fiord One Site (TiAr-1) | 12. Cape Baird Three Site (TjAo-4) |
| | 13. Cape Baird Four Site (TjAo-5) |

DESCRIPTION OF SITES

CONYBEARE BAY

Lonesome Site (Tj-Aq-1) is located on an alluvial fan at latitude $81^{\circ}33'30''$ N., longitude $67^{\circ}00'$ W. The creek here drains most of the highland between Conybeare Bay and Archer Fiord. Where it debouches into the sea, south of the western tip of Miller's Island, it has built up ridges and swales of boulders parallel to the course of the river. These ridges swing to parallel the sea-coast, giving the alluvial fan the appearance of an emergent coastline. South of the site the river cuts through an old shell-covered gravel-beach terrace, approximately 100 feet above present sea-level. The location is one of the best camping sites in the Lady Franklin Bay vicinity. It is easily accessible by dog sled or kayak. There is an abundance of boulders and flat sandstone and slate slabs, and much of the site is dry and well-drained during the melt

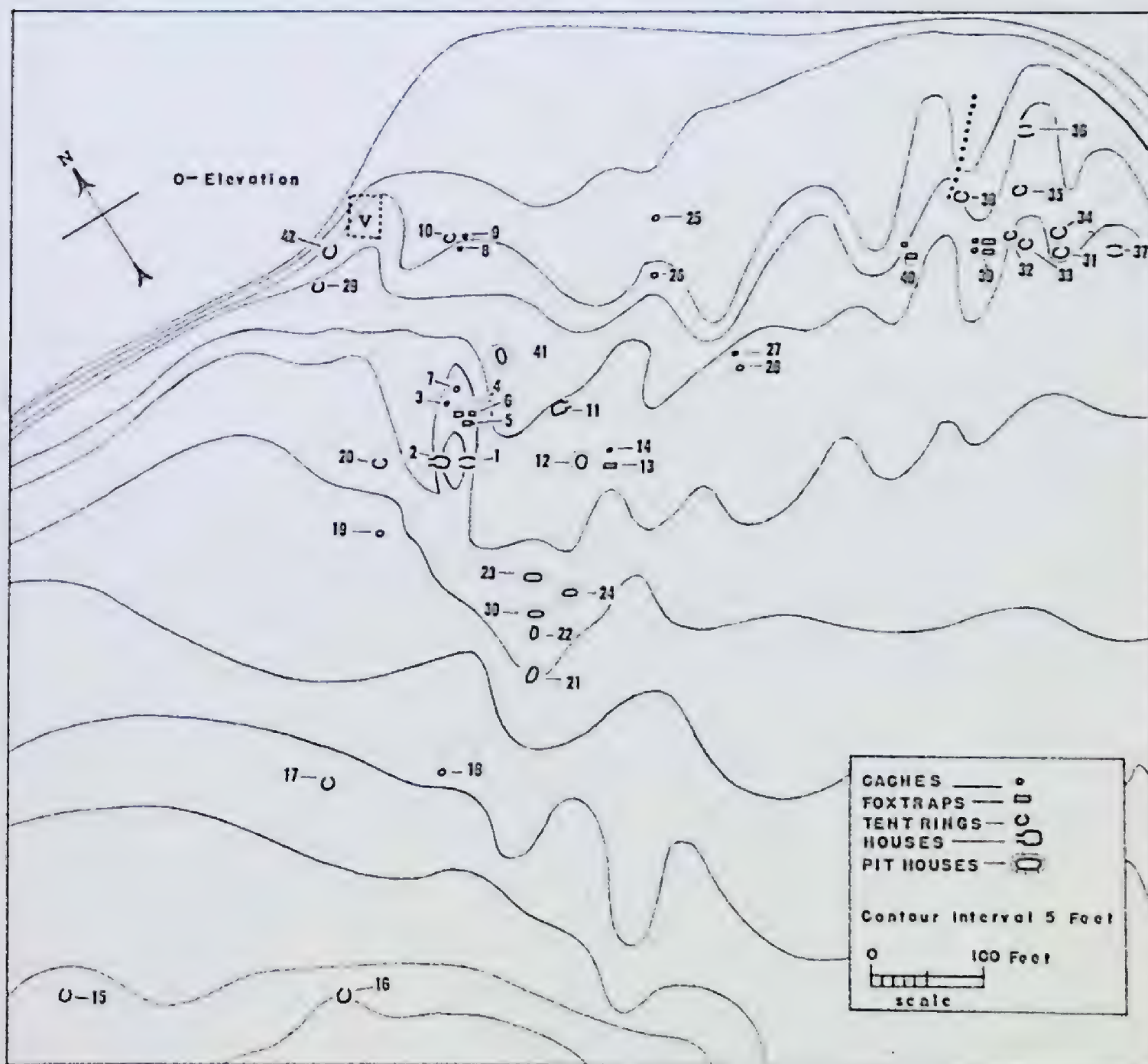


FIGURE 1. Location of prehistoric features on the Lonesome Site, TjAq-1.

season. A low reef of islands extends offshore toward Miller's Island, and there is a clear view from the site east toward Cape Lupton on Greenland and westerly across Conybeare Bay.

The site was first located by Prof. R. E. Deane and Dr. R. L. Christie in June, 1957, [two members of the Greely Expedition (Greely, 1888, p. 236), landed here to hunt muskox but make no mention of the tent rings]. They made a limited surface survey, noting a large number of tent rings and caches, and collected a small wooden toggle, a perforated stone, and a few animal bones. Dr. Christie, Mr. Walker, and I arrived at the site June 7, 1958, when it was still covered with snow. I remained there, mapping the site, making a surface collection, and excavating sample features until June 25 when deteriorating ice in Conybeare Bay made it necessary for us to cross to the other side.

We located 41 features on the site. These included 15 tent rings, 11 caches, 9 fox traps, 8 pit houses, and 3 structures which seem to be simply windbreaks. The structures appeared to be grouped in complexes in some instances, but except for Complex 6 (Features 31 through 40) we found too few artifacts to allow typological comparisons between structures.

TENT RINGS

Generally speaking the tent rings fall into four types. Type 1 is a small circular or oval ring of large boulders with an inside dimension of 6 by 8 feet or slightly larger. The boulders are all laid on the present gravel surface, and the walls are generally one course high; there are no interior features such as floors or platforms, and very little midden in or around the rings (Features 8, 9, 29, 38). Type 2 is similar in size and shape, and small amount of midden. The walls may be as much as three courses high in places, and a part of the interior of the ring is flagged with small flat stones laid on the natural gravel surface (Features 15, 16, 17, 20). Types 1 and 2 appear to be temporary tent sites used for only a few days at most. Tents of type 3 likely were used for longer periods, possibly a season. They are ovals approximately 7 by 12 feet or slightly larger, with walls two or three courses high. Striking the tent partially demolished most of them, and the original walls were probably about 2 feet high. Swales or the edges of slopes were chosen sites for most of these rings, and the natural declivity was used for a short entrance passage. One end of the oval is usually smoothed off, or flagged with small slabs of sandstone for a sleeping platform. Food bones in some quantities lie scattered on the floors and in the entryways, but there is little midden outside the ring (Features 2, 31, 32, 33, 34, 35). Type 4 (3 feet in diameter) is obviously a child's play ring (Feature 19). Other structures classed as small caches may also be play rings.

Feature 2—This tent ring (with windbreak F1, caches F3, F4, and fox traps F5, 6, 7) forms a part of Complex 1 located on a small plateau 30 feet above sea-level in the approximate centre of the site. It is a small oval, 13 by 5 feet, made of large angular boulders up to 300 pounds in weight placed on the present gravel surface. The walls are highest in the middle, rising in three



A. The Delta of Lonesome Creek (Site TjAq-1) from top of 1,500-foot hill south of the site.



B. Tent Ring F31, Site TjAq-1. Butt end of ice axe pointing north.

courses to 20 inches on the north side and 22 inches on the south side. The edge of the small bluff cuts sharply across the northwest end making a natural entryway 3 to 5 feet beneath the level of the tent floor. At the southeast rounded end there are no wall rocks, but the habitation limit is marked by small flat slabs, flush with the present moss cover. This appears to be the remnant of a sleeping pavement, with the end wall demolished for the construction of other features. There were no other interior features. The structure was completely excavated.

Artifacts. One antler knife handle, split, with traces of iron in the end socket (TjAq-1-17), one sled-shoe fragment (TjAq-1-20), and two fragments of wooden objects.

Midden debris. There was no exterior midden. A few bones of caribou, muskox, hare, and seal, in that order of abundance, were found on the floor in front of the sleeping platform and near the entryway. These bones were just under the thin moss mantle or in the top 2 inches of silt and gravel. None of the bones were charred, nor was any charcoal found in the tent ring.

Feature 8—This tent ring (?) (with tent ring F9 and cache F10) forms a part of Complex 2, located on the 10-foot contour. All features in this complex have been demolished, and it is difficult to determine whether they are remnants of tent rings or caches. The approximate interior dimensions of F8 are 7 feet by 6 feet, and the walls consist of a single course. There were no interior features. Stripping the one- to two-inch moss cover from the interior and immediate vicinity of this ring failed to reveal any artifacts. No food bones were found inside the ring; one seal humerus and a caribou scapula were found just outside the north wall.

Feature 9—This tent ring (?) is also demolished. Its approximate interior dimensions are 9 by 7 feet.

Feature 15—is located on the highest inhabited part of the site, a gravel terrace 50 feet above sea-level at the southwest edge of the site. The tent ring is a well-delimited oval, one course high, with interior dimensions 8 by 6 feet. The southern two-thirds of the interior is paved with small flat slabs flush with the present surface. This pavement extends to a small alcove on the west side. Southwest of the ring are two small groups of boulders, possibly cache remnants. Approximately 30 feet southeast of the ring are two large sandstone slabs set vertically in the ground. These may be remnants of an old fox trap, or may possibly be remnants of vertical house partitions similar to those found by Eigil Knuth in the Paleo-Eskimo houses on Polaris Promontory. No artifacts were found in the vicinity of these structures, and there were only a few bleached animal bones on the surface of the entire terrace.



A. Tent ring F34, Site TjAq-1. Entryway to left faces North.



B. Fox trap F5, Site TjAq-1. Trowel pointing North.

Feature 16—is a double tent ring in good condition, located at the southern end of the site on the 55-foot contour. The interior dimensions of the inner ring are 11 and 8 feet. No interior features were apparent, nor were any artifacts found on the surface in the vicinity of the ring. It was left in its original condition.

Feature 17—is a ring of large boulders which has been split by a deep frost crack running north-south. The approximate dimensions are 10 and 8 feet. The walls may have been originally three or more courses high, since the interior is covered with several boulders which have apparently toppled inward as the earth heaved. This ring was left undisturbed. No artifacts were found in the immediate vicinity.

Feature 20—is a small, round, isolated tent ring in good condition on the eastern part of the site. Interior dimensions are 6 by 6 feet. The wall is constructed of relatively small rocks originally laid up in two courses, with no entrance opening. The western half is flagged for a sleeping platform. A few bleached caribou, muskox, and seal bones lay on the surface; no artifacts were found. The ring was left undisturbed.

Feature 29—is a small, round ring two courses high with no interior features, located near the edge of a steep 15-foot bluff overlooking the sea. The interior dimensions are 8 by 8 feet. Within the ring and in the immediate vicinity were several bleached caribou, hare, and seal bones. A bleached and weathered harpoon head (TjAq-1-33) was found on the surface just outside the northeast wall.

Feature 31—is part of Complex 6, a group of caches, fox traps, and tent rings that appear to have been occupied for a period of a few months, rather than a few days. Feature 31 is built on the surface of a small knoll at the edge of a shallow, north-running swale. The ring is oval, 12 by 9½ feet, with an entryway 6 feet long, located in the swale. The habitation was built on the present surface with small boulders in one or two courses outlining the walls and the 8-inch-deep entryway. Opposite the doorway a sleeping platform of gravel and small flat rocks fills half the floor area of the ring. A small quantity of silt has washed into the hollow at the doorway, and here the moss and willow cover was thick, with clear ice and permafrost under the moss. Elsewhere the surface under the tent-ring boulders was a clean water-washed gravel. The structure was completely excavated.

Artifacts. A cylindrical bone harpoon socket, with part of the wooden shaft (TjAq-1-55), an antler harpoon head—Type 5 (TjAq-1-56), thirty-six amber beads (TjAq-1-57), one ivory bead, (TjAq-1-57a), one drilled fox canine (TjAq-1-63), tip of arrowhead tang (TjAq-1-64), a wooden female doll (TjAq-1-80), a wooden fragment (TjAq-1-76), thirty unworked amber fragments (TjAq-1-76), and five undrilled caribou incisors (TjAq-1-65).

Midden debris. There were few animal bones outside the tent ring, but a relatively large number inside and in the entryway. Caribou bones were most prevalent—scapulae, ribs, and limb bones; then hare mandibles, pelves, and feet; muskox scapulae, and ribs; fox mandibles; and seal flippers, vertebrae, and pelves.

Feature 32—This tent ring in Complex 6 is similar to the others in the complex, with two- to three-course walls and a short entryway. The complete structure lies in a natural swale approximately 5 feet deep, and the effect is that of a shallow pit house. The structure was partially covered by ice and snow when we left the site on June 25, and it was left undisturbed.

Feature 33—This tent ring in Complex 6 is also built on a flat surface at the edge of a swale. The ground drops off slightly on the west side of the ring, and this lower ground is used for a short entryway $4\frac{1}{2}$ feet long, entering the ring at right angles to the long axis at about the mid-point of the west wall. The interior dimensions are 13 by $7\frac{1}{2}$ feet. The wall is generally only one course high but rises to three courses at the northeast corner. The south half of the structure has been flagged for a sleeping platform, and there is what appears to be a small cooking (?) alcove at the southwest corner. The structure was completely excavated.

Artifacts. A section of a whale-bone seal probe with antler handle (TjAq-1-72), a cut piece of antler (kayak harpoon rest?—TjAq-1-47), a seal radius ajagaq (TjAq-1-59), and a cetacean pelvis ajagaq pin (TjAq-1-73), an antler arrowpoint (TjAq-1-60), a wooden doll (TjAq-1-42), two antler edge mountings, one with the broken tip of an iron drill embedded (TjAq-1-74, TjAq-1-75), two pieces of drilled bone (TjAq-1-44, TjAq-1-45), part of an ivory buckle (TjAq-1-46), one amber bead (TjAq-1-71), a cut tip of muskox horn (TjAq-1-51), and several pieces of driftwood.

Midden debris. Most of the food bones were inside the tent ring, in front of the sleeping platform. Caribou, hare, and seal were the predominant species.

Feature 34—also part of Complex 6, is a narrow oval 12 by 6 feet. It lies in a natural draw and appears to be in a good state of preservation. In many places the walls are three to four courses high. It also appears to have an entryway at the north end of the long axis. The interior of the ring was still covered with snow and frozen moss when the site was left on June 25, and it was left undisturbed.

Feature 35—appears to be partially demolished. It is a wide oval, 11 by 9 feet, with a jumbled mass of boulders, two to three courses high, forming the walls. The interior is covered with a number of large boulders in no apparent arrangement, and there is what appears to be a demolished short entryway on the southeast corner. An unusually large number of animal bones were

found inside this tent ring, and two small charred areas against the west wall indicate that food was cooked inside the structure. At least two inches of culture-bearing silt under the covering moss remained frozen on leaving the site, and this structure was only partially excavated.

Artifacts. A piece of cut birch bark (TjAq-1-61), pieces of unworked amber (TjAq-1-66), fourteen amber beads (TjAq-1-67), a cut goose ulna sucking tube (TjAq-1-68), tip of bone arrowhead (TjAq-1-69), an antler bow brace (TjAq-1-70), a piece of iron pyrites (TjAq-1-78), an antler harpoon ice pick (TjAq-1-81).

Midden debris. There was an unusually large amount of midden debris scattered over the entire interior of the structure. Hare bones were predominant, with caribou, goose (and other fowl), seal, muskox, and fox bones in that order.

Feature 38—is an isolated tent ring with walls two courses high and an interior dimension of 8 by 8 feet. It has no entryway or interior features. No artifacts were found in the vicinity, but there were an unusual number of very small pieces of driftwood around the walls, some of them charred.

CACHES

Eleven of the structures on the site were presumably meat caches (Features 3, 4, 10a, 14, 18, 25, 26, 27, 39b1, 39b2, and 40b). These were simply piles of boulders, roughly circular and ranging from 6 to 10 feet in diameter. A few of the more elaborate ones (F25a and F26) had small, flagged floors with a four-sided "box" in the centre. No artifacts or midden debris were found around any of these caches.

FOX TRAPS

There were nine carefully constructed fox traps, most of them located on high spots of the site (Features 5, 6, 7, 10b, 13, 28, 39a1, 39a2, 40a). Feature 5 is typical of all the fox traps found during the 1958 season. It was essentially a stone box made by first laying a slab of slate 36 inches long by 14 inches wide on the smoothed gravel surface. The north side was a 3-inch rectangular slab of sandstone 32 inches long by 10 inches high, set on edge on top of the floor slab. The south side consisted of two roughly rectangular boulders with flat faces placed inward, making a wall 12 inches high. The slab wall was chinked up to 12 inches, and three large flat-faced boulders were placed over the walls to form the roof. At the east end, smaller stones had been laid up in four courses with a small triangular, protruding "bait" stone placed between the second and third courses. This made a tight box, open at the west end, 30 inches long, 10 inches wide, and 12 inches high. A heavy deadfall boulder had been balanced over the open end to fall and close the trap when the fox pulled the bait from the bait stone. A large mass of heavy boulders was then placed over the stone box. None of the fox traps investigated contained any bones.



A. House F11, Site TjAq-1, before excavation. Trowel pointing North.



B. House F11, Site TjAq-1, after excavation. Entryway and lintel in background.

HOUSES

Eight of the structures on the site are presumably winter houses, although they are all small, are very simply constructed, and do not appear to have been occupied for extensive periods. In each case the inhabitants scooped from the gravel a shallow oval pit, 1 to $1\frac{1}{2}$ feet deep, for the habitation area. A ridge of gravel and a row of rocks one to three courses high usually outline the pit. Generally, there are fewer rocks around the edge of these pit houses than were used in the surface tent rings. Some of the pit houses appear to have short entryways.

Feature 11—with another pit house (F12), a cache (F14) and a fox trap (F13) make up Complex 3. F11 is built on the edge of a low gravel bench, and the terrain has slumped immediately behind the entryway carrying part of the wall and floor with it. The interior of the shallow pit is $9\frac{1}{2}$ feet long from the rear wall to the door, and $4\frac{1}{2}$ feet wide at the widest point. Opposite the door the pit is shallower, and the gravel has been smoothed off for a sleeping platform $3\frac{1}{2}$ feet long and $4\frac{1}{2}$ feet wide. This was not paved, but on excavation, a long, narrow sandstone slab was found lying across the platform. This was interpreted as a roof beam rather than covering for the sleeping platform. The surface depth of the platform was 12 inches. In front of the platform the floor, flagged with small slabs of sandstone, dropped to 18 inches. Four long sandstone and slate slabs lay crosswise inside the house and rested on top of the paved floor. These also were considered to be roof beams. The mouth of the entryway was carefully constructed with two matched sandstone slabs for lintels, making a doorway $2\frac{1}{4}$ feet wide and 14 inches high. The exterior entryway had been demolished. Since it was located in a natural swale, the floor of the front of the entrance would have been approximately 30 inches below the level of the sleeping platform. The floor area in front of the sleeping platform narrowed to $3\frac{1}{2}$ feet in width. A small paved alcove, $2\frac{1}{4}$ feet wide and $1\frac{1}{2}$ feet deep, extended from the southeast corner of the floor just west of the entryway. Apparently this was a cooking site, since the soil was saturated with charred seal fat. Food bones were also concentrated in this area.

The house, although very small, was undoubtedly a winter habitation. The roof beams appear to have been the flat slabs of sandstone that lay over the floor and the sleeping platform, and some slabs found lying outside the walls. Although these are roughly as long as the house is wide, they must have been cantilevered under wall rocks to give sufficient height to the house interior. It would have been necessary to abandon the house in June since melt-water flows in a stream across the length of the house pit. Part of the heavy silt deposit at the entryway was still frozen when we left the site.



A. Pit house F12, Site TjAq-1, before excavation. Trowel points North.



B. Pit house F12, Site TjAq-1, after excavation. Trowel points North.

Artifacts. The only artifacts in the house were two drilled seal canines (TjAq-1-24, 25) found on the floor near the cooking alcove. Two pieces of cut caribou antler were found outside the north wall (TjAq-1-34, 35).

Midden debris. There did not seem to be enough midden debris on the house floor or outside the walls to account for the winter food consumption of even one person. The debris, most of it concentrated along the south wall near the cooking alcove, included—several seal phalanges, one seal mandible, one fox mandible, several hare mandibles, caribou scapulae and vertebrae, and goose bones.

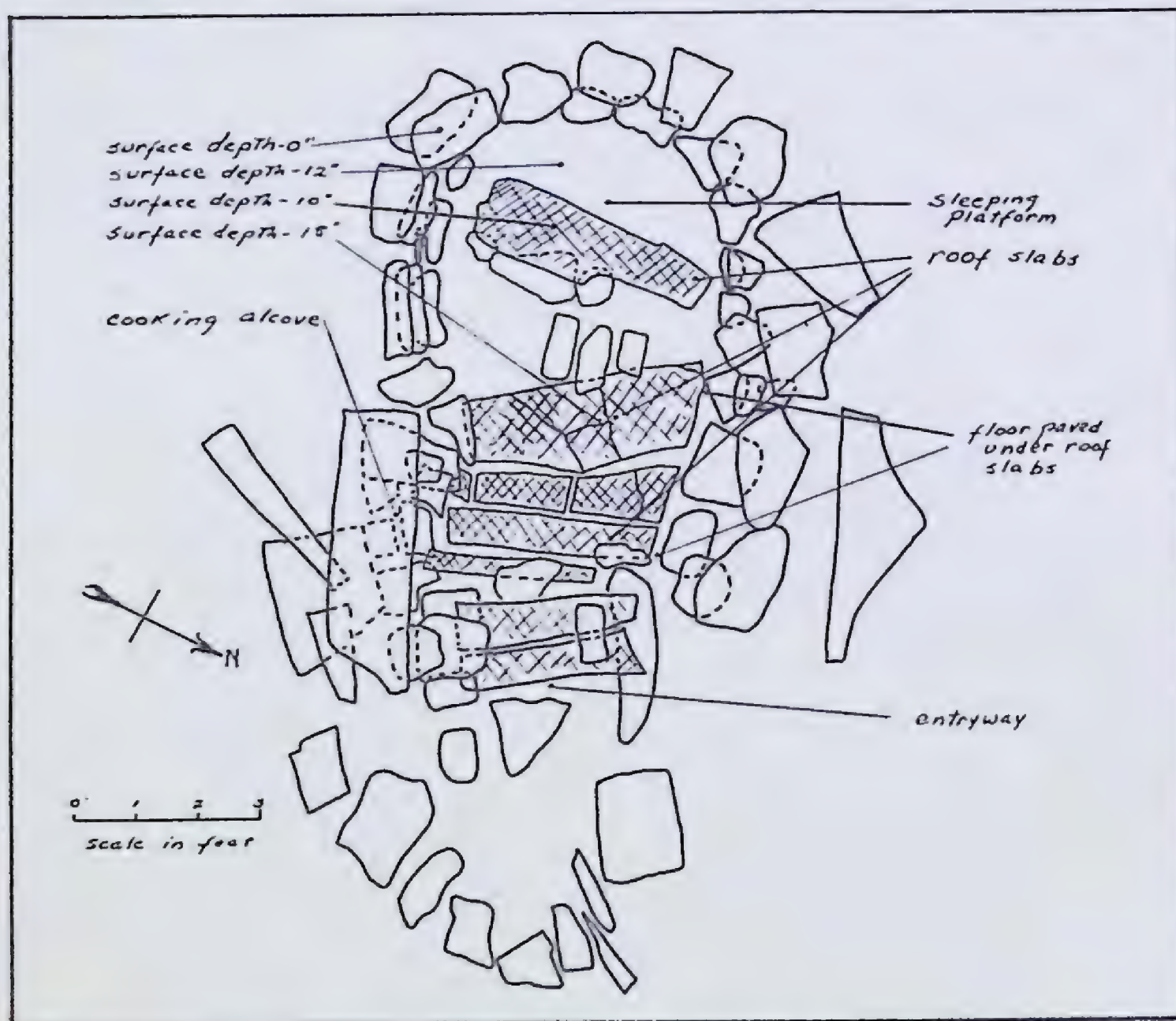


FIGURE 2. Plan view of House F11, Site TjAq-1.

Feature 12—also part of Complex 3, is a shallow pit house scratched out of the gravel beneath the slope of the bench on which the structures of Complex 1 are located. The pit, 5 inches deep before excavation, lies on level terrain and has no depressed area for an entryway. The interior dimensions were 9 by 4 feet,

with walls demarcated primarily by a low ridge of gravel. The west wall also contained three large rocks and a few small cobbles; the east wall was barely outlined by a few small cobble stones in addition to the low gravel ridge. An unusual amount of silt and moss covered this pit (the silt washed down over the slope to the west). Beneath the silt, at a surface depth of 6 inches, a carefully flagged sleeping platform 5 feet long and 4 feet wide covered the south end. In front of the platform, three isolated sandstone slabs and a few animal bones at a surface depth of 10 inches mark the small floor area. There were no other interior features.

Artifacts. No artifacts were found in or around the house.

Midden debris. Food remains were very scanty. The few bones were primarily caribou scapulae and phalanges. The rest were seal bones from three flippers and the left half of a mandible. None of the bones were charred.

Feature 21—with pit houses F22, F23, F24, and F30, forms a distinct complex of structures (Complex 5). The houses are all small, ranging from exterior dimensions of 12 by 9 feet to 9 by 4 feet, and the present depth ranges from 5 to 12 inches. Features 21 and 22 are mainly outlined by a low ridge of gravel, with few rocks in the walls. Features 23 and 24 are outlined by rock walls which stand 10 to 12 inches above the present surface. Feature 30 does not have walls above the surface, but the sides of the pit appear to be walled. We excavated none of these houses. As soon as the moss covering the pits thaws enough for excavation, the house pits fill with melt-water. Attempts to drain them were unsatisfactory, and when we left the site at the end of June they were still filled with water, with clear ice beneath. Apparently these houses cannot be excavated until mid-July—a time when it is no longer possible to cross Conybeare Bay.

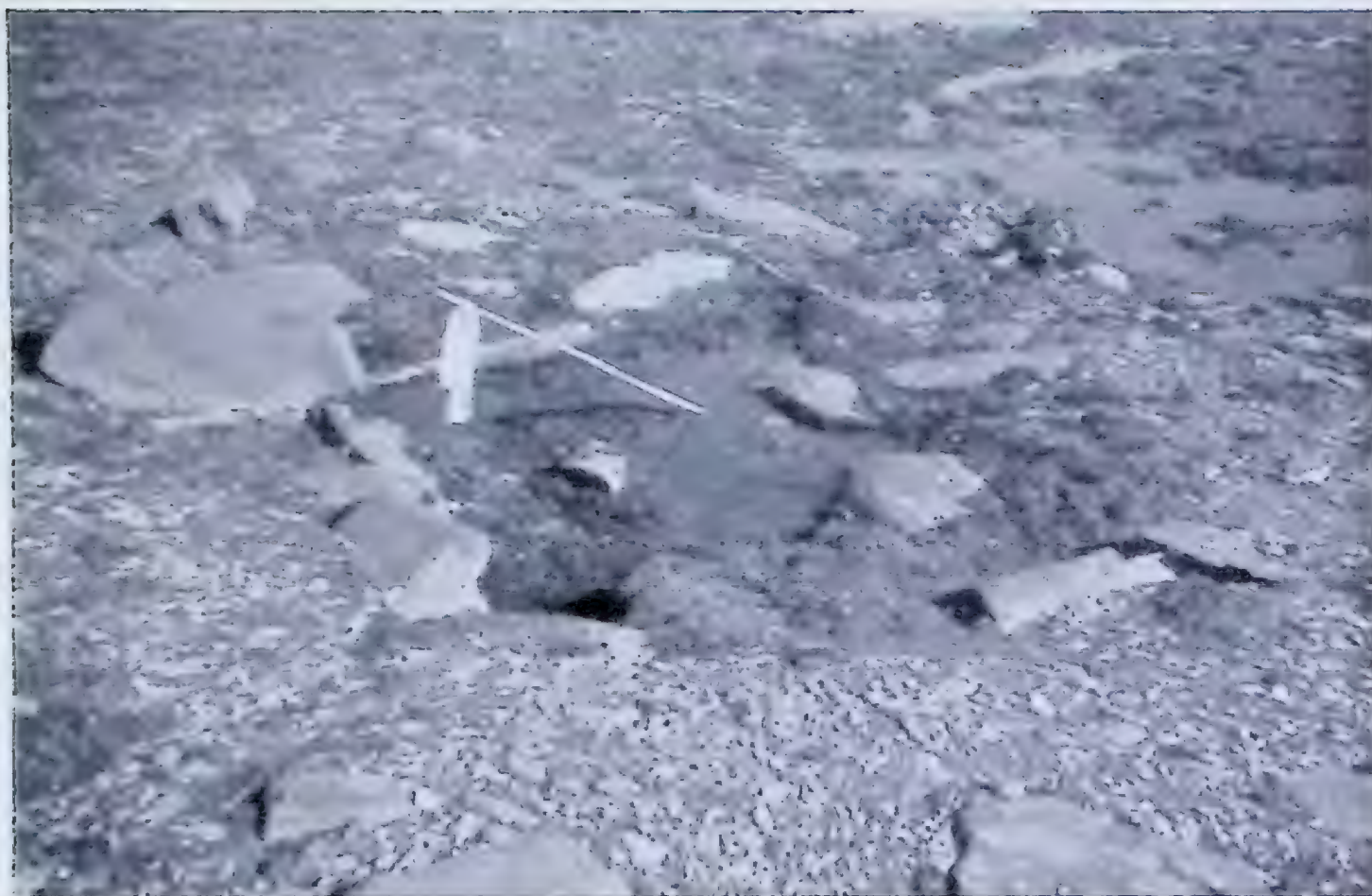
Artifacts. One soapstone lamp sherd (TjAq-1-23) on the surface near Feature 24. No other artifacts were found in this complex.

Midden debris. There is a thin midden with deeply weathered bones on the surface around each of the houses. They include muskox, caribou, seal, hare, and polar bear bones.

Feature 41—is an isolated pit house beneath the slope of Complex 1, deeply filled with moss and silt. It appears to be nearly round, measuring 9 by 8 feet, lined with rocks laid up in two courses. We removed the heavy moss layer to expose the frozen silt and left the house unexcavated for some future season.

WINDBREAKS

Three of the rock structures on the site, although carefully built with large boulders laid up in two or three courses, appear to be simply windbreaks rather than over-night shelters. Feature 1, on the high bench in the centre of the site, is typical of this group of structures (Features 1, 36,



A. Pit house F30, Site TjAq-1, not excavated in the 1958 season.



B. Fox traps and caches, Site TjAr-1—Tent Ring Creek.

and 37). The builders laid up large boulders in two to three courses with parallel walls on the east and west sides. The open north end of the 11-by 10-foot feature faces the flat surface of the small plateau on which it lies; the open south end faces a steep slope 5 feet high. In the centre of the interior was an open rock fireplace containing charred bone, marine shells, willow stems, and sedge grass. Midden debris, which was sparse, included a seal mandible, seal humerus, caribou metapodial, polar bear clavicle, and a number of small clam shells. The only artifact was a tiny bone peg. Feature 37 had a similar open fireplace; Feature 36 was not excavated.

OTHER FEATURES ON THE SITE

Although there were thin deposits of midden on the surface of the small bench associated with Complex 1, there were no significant midden deposits associated with any of the houses or tent rings. Surprisingly, the most extensive midden, Area V, was on the edge of a steep bluff overlooking the sea, 60 feet from the nearest tent ring. This appears to be a "picnic ground" which many people used over an extensive period of time. A solid layer of bones, 1 to 2 inches thick between the overlying moss and the sterile gravel, covers a space of approximately 900 square feet. Time did not permit an appraisal of this bone mass, but all were left in place for future analysis. In a sample the bones belonged to four species; in order of abundance: hare, fox, seal, and caribou. Five hundred half-mandibles of fox were counted in this sample. Artifacts in the midden included; a drilled stone toggle (TjAq-1-37), a small narwhal ivory harpoon dart head (TjAq-1-39), a broken bone projectile point (TjAq-1-52), a broken ivory button (TjAq-1-53), a fragment of whale bone sled-shoe (TjAq-1-82), a fragment of cut bone (TjAq-1-83), a fragment of cut narwhal ivory (TjAq-1-84), and an antler projectile point (TjAq-1-85).

Stone Lamp Site (TjAq-2) is located on a prominent point one mile west of Lonesome Site. The terrain is very unfavourable for a camp-site. There is only a small spot of gravel shingle close to the water's edge, and this is on a slope of 20 degrees. However, a complete soapstone lamp (TjAq-2-1) with a patch for the broken end lay on the surface of the gravel. Close by, there were a few seal bones, a muskox metapodial, and a large piece of driftwood, but no associated rock structures.

Tent Ring Site (TjAr-1) is a boulder-strewn alluvial fan at the mouth of a small creek (81°33' N., 67°41' W.). It hardly seems a desirable camping site since the only level spots are the interiors of the tent rings, but from the number of rock structures, wandering hunters apparently used it rather extensively.

Lt. Lockwood of the Greely Expedition first visited this site on August 22, 1882. He was less interested in Eskimo habitations than some other members of the expedition, and says only that he saw "extensive traces of Eskimo—perhaps two dozen 'meat caches' and several old bone implements" (Greely, 1888, p. 236). Greely's artifact catalogue shows only "one spear head and one bone" from this site.

The site was next visited by Dr. Deane and Dr. Christie in June, 1957. In their limited surface search, they found food bones, but no artifacts. Dr. Christie, Mr. Walker, and the author arrived at the site on June 6, 1958. Snow still covered the surface, and only a few stone rings rose above the snow. On the night of June 21, 1958, I returned to the Tent Ring Site from my base at the Lonesome Site. My total stay at the site was six hours, and I do not consider that the archaeological survey of this site was adequate.

I counted 31 rock structures on the site. This may not be the total. The site is one mass of boulders, many of them piled up by water action. It is difficult to distinguish the man-made piles of rock. There is no moss or silt, and all structures were built on the present surface.

The structures fall into the following general types: (1) Small round rings 4 to 6 feet in diameter, with floors completely paved with small flat rocks, and walls 2 to 2½ feet high, laid up in three to five courses. An opening in the wall is the only entryway (four examples of this type). (2) Circular tent rings 7 to 8 feet in diameter, outlined by a single course of rocks, with no interior paving (ten examples). (3) Oval tent rings 8 to 9 feet long and 5 to 6 feet wide, with walls laid up in two or three courses of large boulders, and half of the tent ring along the long axis paved for a sleeping platform. Opposite the short axis, and just outside the wall of one of these rings was an open stone fireplace filled with charcoal and charred seal grease (three examples). (4) Meat caches—large piles of rock 4 to 5 feet in diameter (six examples). (5) Stone box fox traps, similar in size and construction to those described on the Lonesome Creek Site (six examples).

None of the habitations appear to be more than short-term camping sites. Very few food bones litter the surface, and a careful surface search failed to reveal any artifacts.

ARCHER FIORD

Dr. Christie and Mr. Walker followed the southern coast of Lady Franklin Bay eastward in the period from June 8 to 25, 1958, and conducted an archaeological survey in addition to their geological work. The Archer Fiord and Cape Baird sites are the result of this investigation. Dr. Christie has become very skilled in recognizing the often obscure piles of rock that mark an Eskimo habitation, and I feel certain that the eight sites listed here are the only important ones between longitude 67° W. and Cape Baird on both shores of Archer Fiord.

Archer Fiord One (TiAr-1) is at the mouth of a creek on the south shore of Archer Fiord which flows from a river system crossing Judge Daly Promontory. The site consists of two meat caches, and what are probably the remnants of two fox traps on the west bank of the creek mouth.

Archer Fiord Two (TiAq-1) on a small creek terrace 15 feet above sea-level was located by Christie in 1957. He found two crude rings about 8 feet in diameter and a few deeply weathered food bones, but no artifacts.

Archer Fiord Three (TiAp-1) is a tent ring which Christie considered to be older than others in the area because of the unusual amount of vegetation around the rocks. He says that the ring is not distinct but is certainly man-made. It is roughly elliptical and is 6 feet in length along the major axis. Near by, and closer to the shore is a small cache.

Hematite Site (TjAo-1) is the most westerly of a group of five sites near Cape Baird. The structures consist of two tent rings, two small caches or fox traps, and four large caches. The tent rings are well defined on the flat gravel shingle and are adjacent to each other. Both are outlined with a single course of rock, with no paved sleeping platform. One, 10 feet in diameter, has what appears to be a round, open fireplace in one end. The other, 5 by 8 feet, has no interior features. An antler side prong for a fish spear (TjAo-1-1) lay on the surface in the interior of the latter tent ring. A number of deeply weathered bones litter the site, including some of caribou and muskox.

Cape Baird Sites. Easterly from Hematite Site to the tip of Cape Baird there are four sites within a distance of $1\frac{1}{2}$ miles. TjAo-2 is probably a cache. TjAo-3 is an oval tent ring with a single course of rocks and no interior features. It is 5 feet wide by 9 feet long and is located 100 feet from the shore. TjAo-4, on a large creek delta or alluvial fan, is just west of the round brown hills of Cape Baird. There are at least 13 structures on the gravel surface. Most appear to be caches, but some are circular tent rings 10 feet in diameter, a double row of rocks marking their outlines. Of the double-walled structures, the neatly laid out inner row defines the wall. The outer row, constructed of smaller stones to hold down the skin roof, is more haphazard. One pile of large boulders built on a cobble pavement about 6 feet in diameter may have been a grave, although Christie and Walker could see nothing inside without disturbing the rocks. Christie interprets one structure, two slightly elliptical rows of rocks 15 feet long and 5 feet apart, as one of the boat caches the Greely party built to support an overturned square stern boat. A small piece of canvas, a piece of cotton rope, and a piece of wood with nail holes were associated with this structure. One-quarter mile east of this site is TjAo-5, the site of two, or possibly three, stone caches.

In 1882 Sgt. Brainerd first visited one of these sites, probably TjAo-4. He found the sites of 18 tent rings forming circles from 5 to 15 feet in diameter and gathered a "large number of artifacts." These included the two upstanders, runners, bone shoes, and crossbars of a complete sledge; a very large steatite lamp (15 inches across), and a "bone spear head and relics of like material whose use was unknown to our Danish Eskimo." (Greely, 1886, Vol. I, p. 420). Unfortunately only the lamp and sled are identified and illustrated.

DISCOVERY HARBOUR

We crossed Conybeare Bay on June 25, 1958. By this time 8 to 10 inches of melt-water, through which the dogs reluctantly waded as the men skied alongside, completely covered the sea-ice. We struck the north coast of the bay almost due north of the west end of Miller's Island and searched

unsuccessfully for Eskimo sites as far east as Sun Bay. Sgt. Brainerd had reported a site of 15 tent rings in Sun Bay, but a thorough search of the bay's coastline failed to disclose any traces of Eskimo habitation. Sun Bay, in spite of first impressions, is a very poor camp-site. The bay is rectangular; its mouth, $1\frac{3}{4}$ miles wide, faces due south, and its straight sides extend northward $2\frac{1}{4}$ miles. This peculiar shape and location trap quantities of bergy bits, rafted chunks, and hummocky ice. Most of this rough ice never leaves the bay, making sledging conditions to nearby sealing areas very difficult. The west coast of the bay is a sheer talus slope; the east coast is generally steep with few flat spaces. The head of the bay is a low mud flat, only a few feet above sea-level, extending north for $1\frac{1}{2}$ miles to the tide flats at the head of Basil Norris Bay. Not only are there no rocks or gravel patches on the mud flats, but the site is also in a natural wind tunnel which extends from the sea to the ice-fields 45 miles away via the north-northwest-running Bellows Valley. Since Brainerd (Greely, 1886, Vol. I, p. 360) speaks of an estimated 15 summer tent rings in Sun Bay, and an estimated 15 others in Basil Norris Bay and since all other accounts link the Sun Bay - Basil Norris sites together, I suspect that this is an inaccurate double entry in the journal.

On June 26 Walker and I crossed the mountain saddle to the east, emerging at a small alluvial fan on the south coast of Discovery Harbour. The site on this gravel delta has the appearance of being seasonal, although the only artifact found was a small piece of cut antler (TkAp-2-1). A peculiar stone ring of white quartzite boulders on the western tip of the delta has the appearance of a tent ring, but it may be a remnant of a Greely party camp.

We made our way from here along the ice foot, west to the low tide flats at the head of Basil Norris Bay. This bay has trapped unusual quantities of driftwood. We found logs the size of telephone poles, stumps, boxes, barrel staves, and even a picket from a fence. There were also several pieces of a red volcanic tuff (pumice?) which had drifted here. On the southwest shore of the bay, on a flat silt bench 70 feet south of the bay and 45 feet above the waterline is the site Brainerd discovered, which members of the Greely party visited several times. We were particularly interested in the Basil Norris Site (TkAp-1), because among the artifacts they had collected here was a Dorset harpoon head. They reported 15 tent rings, and "one place which resembled a house 6 feet square built of large flat stones. The roof had fallen in" (Greely, 1888, p. 28). We counted 12 tent rings and found the square house, of which only the foundation remains. The tent rings were oval, 8 feet long by 4 to 5 feet wide, with half of the interior paved for a sleeping platform. All of the structures lie on the present surface. A surface search yielded a large barb for a salmon spear (TkAp-1-2), fragments of a steatite lamp including part of a large wick ledge (TkAp-1-4), a bone wedge (TkAp-1-3), a piece of cut antler, and, in the square house, a Dorset fish-harpoon (TkAp-1-1). An unusual quantity of bones littered the scene: muskox, seal, caribou, hare, and fox, in that order. However, there was not, as Brainerd had reported, "fully a ton." Greely's party, in addition to the Dorset harpoon, had found a bone sledge runner drilled with 42 holes, a harpoon foreshaft (not illustrated), a dog trace buckle, one "small article of walrus ivory," and "many relics worked, drilled, and bored."

We left the site undisturbed because of its significance as possibly the oldest site in the area, and because of our tight time-schedule which made careful excavation impossible. We were also unable to visit other sites near Fort Conger located by the Greely party.

We started our back-pack trip up Black Rock Vale on June 27, keeping to the west side of Lake Heintzelman and the valley. This, and the Ruggles Valley are the most likely sledge routes to Lake Hazen. But we found no sites along the way other than one of Greely's over-night camps. This was apparently his second camp on the trip north to Lake Hazen. He returned along the east side of the valley and says that "just before reaching this camp a number of places were passed which evidently had served as sites for summer encampments for the Eskimos. We were in too exhausted a condition to make more than a cursory examination, but I noted that there were about a dozen circles along our immediate route" (Greely, 1886, Vol. I, p. 410).

We failed to locate these tent rings, but since we were concentrating on the west side of the valley and were unaware of this reference at the time, we may well have overlooked them.

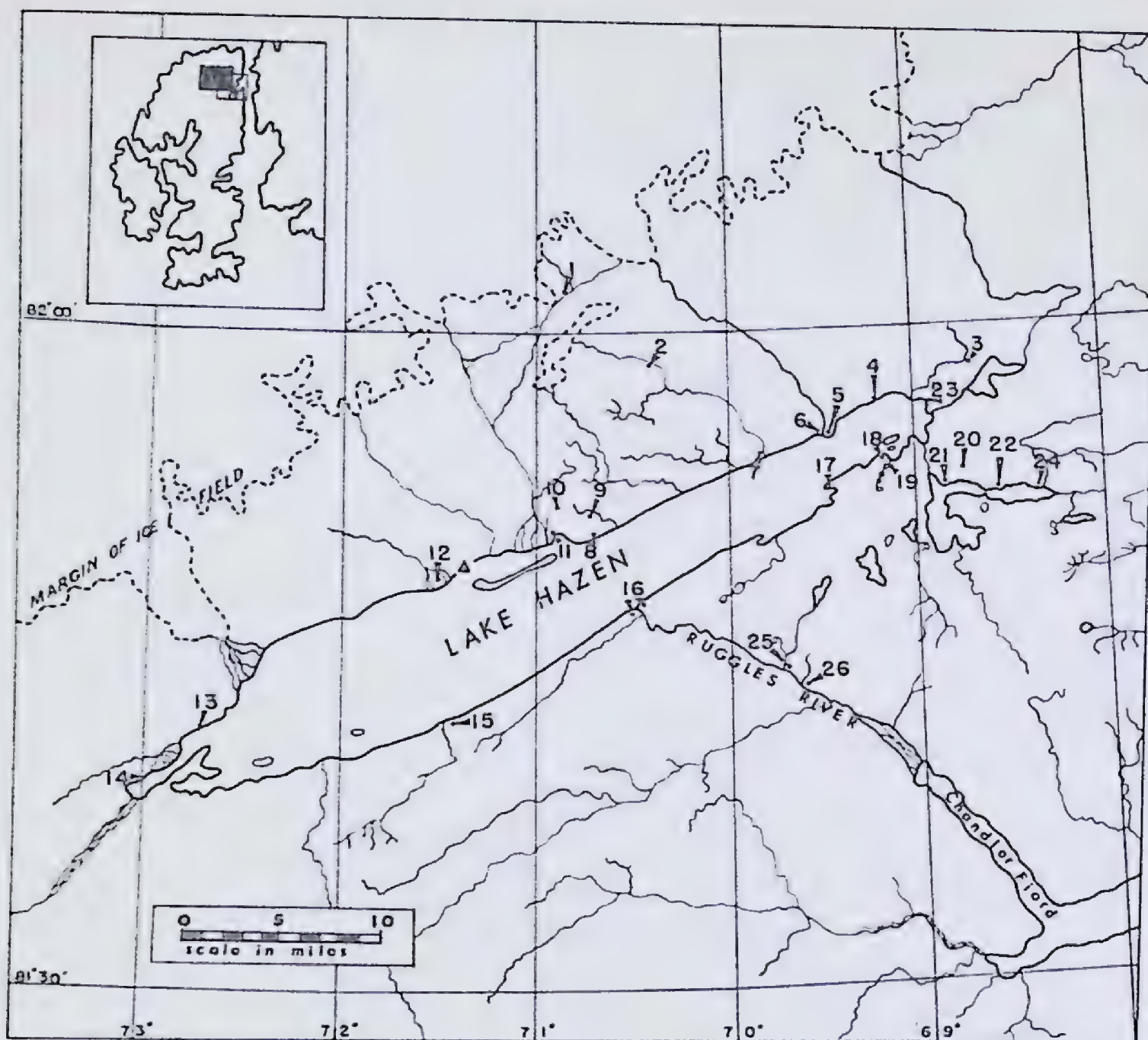
Near Lake Hazen the valley opens out into a broad plain filled with shallow lakes. Midway along the north shore of Lake Kilbourne, a point of land sticks out in the lake. A stone pile cache on this point (TlAs-4) is visible for several miles. Near the west end of the lake is a group of two unpaved tent rings (TlAs-1) on a low silt bench. A group of four unpaved rings lie on a silty point near the outlet of Lake Craig (TlAs-2). Later in the season I walked the circumference of Lake Craig without finding any other site. The only artifact found near the lake was a broken harpoon shaft associated with Site TlAs-1.

As we were coming up the Black Rock Vale, other members of the Lake Hazen party found a broken but complete bowl of schistose soapstone on the crest of a ridge one mile north of Lake Craig and 200 feet above it. There were no other cultural associations, and I consider it likely that Greely and Lynn were carrying it back from their excavations at the mouth of the Ruggles River and left it here to reduce their weight. Its find-spot (TlAs-3) is a most unlikely location for a camp, or for a travelling sledge, but it is on the route that the two men probably used in re-entering Black Rock Vale.

LAKE HAZEN

Lake Hazen is a pleasant place in summer, but apparently even the Eskimos found it less than ideal in winter. We located 20 sites of Eskimo structures on or near the lake, but only three of these sites were possible winter quarters, and one of these was a group of winter houses built by Peary's Eskimos in 1906.

There appears to be a local permanent high-pressure cell over the Lake Hazen Basin. In summer both Ruggles Valley and the Bellows have almost constant up-slope winds blowing from the fiords into the lake area, and in winter there is a natural down-slope drainage of cold air from the high snowfields into the lake basin. As a result, the region is significantly colder in winter than comparable locations on the bays and fiords.



MAP 2. Location of sites in the Lake Hazen Region. (The triangle marks the location of Base Camp.)

- | | |
|--------------------------------|----------------------------------|
| 1. Dryas Valley Site (UaAv-1) | 14. Turnstone Site (TjFb-1) |
| 2. Plateau Site (TIAu-5) | 15. Cobb River Site (TjFa-1) |
| 3. Marsh Cotton Site (TIAAs-6) | 16. Ruggles Outlet Site (TkAu-1) |
| 4. Wolf Trail Site (TIAAt-2) | 17. Site TIAAt-4 |
| 5. Gilman East Site (TIAAt-3) | 18. Site TIAAt-7 |
| 6. Gilman West Site (TIAAt-1) | 19. Site TIAAt-6 |
| 7. Section Site (TIAAt-5) | 20. Site TIAAs-3 |
| 8. Boat Haul Site (TIAu-3) | 21. Site TIAAs-2 |
| 9. T Creek Site (TIAu-4) | 22. Site TIAAs-1 |
| 10. Snow Owl Site (TIAu-2) | 23. Peary Site (TIAAs-5) |
| 11. Site TIAu-1 | 24. Site TIAAs-4 |
| 12. Blister Site (TIAv-1) | 25. Tent Flap Site (TkAt-1) |
| 13. Super Cub Site (TkFa-1) | 26. Site TkAt-2 |

Furthermore, few locations along the lake shore afford the proper combination of level ground and flat stone slabs for house building. Although the "Gilman Delta" has no flat slabs, it has an abundance of large boulders and ample flat ground. Eskimos wintering here could sledge up the "Gilman Valley" to the alpine meadows north of the lake, which are apparently the wintering grounds for the muskox. A small exposure of Cape Rawson slate at the northeast end of the lake attracted the wintering parties of Peary's Eskimos. They built two winter houses here as close as possible to the rock outcrop 600 yards east of the lake shore and about 200 feet above it. This location also provided easy sledging to the mountain valleys, and to Cape Sheridan where most of Peary's party were wintering. Along the south shore of the lake, a thick, unstable silt layer covers the Cape Rawson beds close to the shore. Erosion of the Ruggles River at the lake discharge point has uncovered a large enough exposure to provide ample large flat slabs of sandstone and slate for floor pavements, sleeping platforms, and possibly roof slabs. Here Greely in 1882 (Greely, 1886, Vol I, p. 379) located two groups of winter houses, one on each bank of the river. The three houses on the east bank have since been washed away by a changing river current; one of the two west houses was completely excavated during the 1958 season. This location has many points in its favour, in spite of the fact that it is colder in summer, and possibly also in winter, than any other location on the lake because of the nearly constant wind that blows through the valley. It provides easy sledging to the fiords, or across the frozen lake to the larger valleys. As well, it is a natural and heavily populated spawning spot for the Arctic char, and because of complicated hydrological factors a large area at the head of the river remains unfrozen even in the coldest period of winter—affording excellent fishing at a time when the rest of the lake is covered by 4 to 6 feet of hard ice. Elsewhere around the lake shore, the habitation structures appear to be only stone rings for summer tent supports.

Dryas Valley Site (UaAv-1) consists of one well-defined tent ring, of special significance because of its northern position—12 air miles north into the mountains from the lake shore—and because of its proximity to an existing glacier. The site and its relationship to the glacier are best described by its discoverer, Dr. G. Hattersley-Smith.

The site is situated at an elevation of 2,200 feet on a river terrace 29 feet above and about 50 yards west of the junction of "Dryas River" with the north-bank tributary, one mile east of the glacier which pushes half-way across "Dryas Valley." The outside dimensions are 6 feet by 4 feet, which, allowing for the thickness of the rocks, means 5 feet or less inside room. A close mat of grasses with some poppy sorrel and *Ranunculus* grows inside and forms a "turf" up to 4 inches thick. There were two or three rocks in the middle of the ring, and on moving one I found a piece of bone which was collected. (Hattersley-Smith, letter to M. S. Maxwell, 19 December, 1958.)

There were no interior features in this ring, and the single piece of bone associated with it is an unworked fragment of muskox femur. Although it is impossible to date this tent ring even sequentially, it is significant to note that all other interpretations of habitation in the area suggest that it is some centuries old, during which time the face of the glacier has remained relatively static if not advancing.

Plateau Site (TlAu-5), also well up in the foothills north of the lake, is a site of three small tent rings, each approximately 5 feet in diameter, and was located by Mr. H. Sandstrom and Mr. J. R. Weber. According to the discoverers, there was no indication of internal structure, nor of artifacts associated with the rings. The author relocated these rings in an aerial reconnaissance but has nothing significant to add.

Marsh Cotton Site (TlAs-6) is located on a low gravel bench overlooking a small stream on the broad flat valley northeast of the lake. At the site location there is an abrupt change from the eastern silty "badlands" to low gravel benches with a few small boulders. Here were two tent rings, or, more probably, a tent ring and a cache. The easterly ring consisted of a double row of small boulders, with an interior dimension of 8 by 7 feet. The southern half of the interior was paved with small flat rocks, making a sleeping platform 5 by 6 feet. A small fireplace had been built in the wall at the back end of this sleeping platform. This tent ring was excavated completely, but there were no artifacts inside the rock circle. Outside were a few shavings of antler and two cut pieces of antler, but no artifacts. A muskox skull, so old that only the horn cores remained, had been incorporated in the south wall.

Wolf Trail Site (TlAt-2) on a beach at the northeast end of the lake was apparently not a habitation site but, from the flotsam on the beach, appeared to be a terminus for lake currents. There were a number of wooden artifacts from Peary's group, and one old wooden harpoon shaft which had been tipped with a pegged, scarfed harpoon socket similar to the one (Plate I, fig. 9) found on the Gilman East Site.

Gilman East Site (TlAt-3). The river delta here was one of the few locations on Lake Hazen regularly used as a habitation site. East of the river there are ten tent rings, two of them cut by river erosion, one "child's" tent ring, three caches, and one fox trap.

TENT RINGS

Feature 1—is a small ring built of a single course of small stones on a 6-foot-high clay bank at the edge of the river. The interior dimensions are $6\frac{1}{2}$ by $4\frac{1}{2}$ feet. There are no interior features, no associated artifacts or food bones.

Feature 2—is of similar size, slightly cut by river erosion. A few old, weathered muskox bones were found in association.

Feature 3— $6\frac{1}{2}$ by 6 feet, is similar in construction with a few associated old muskox bones.

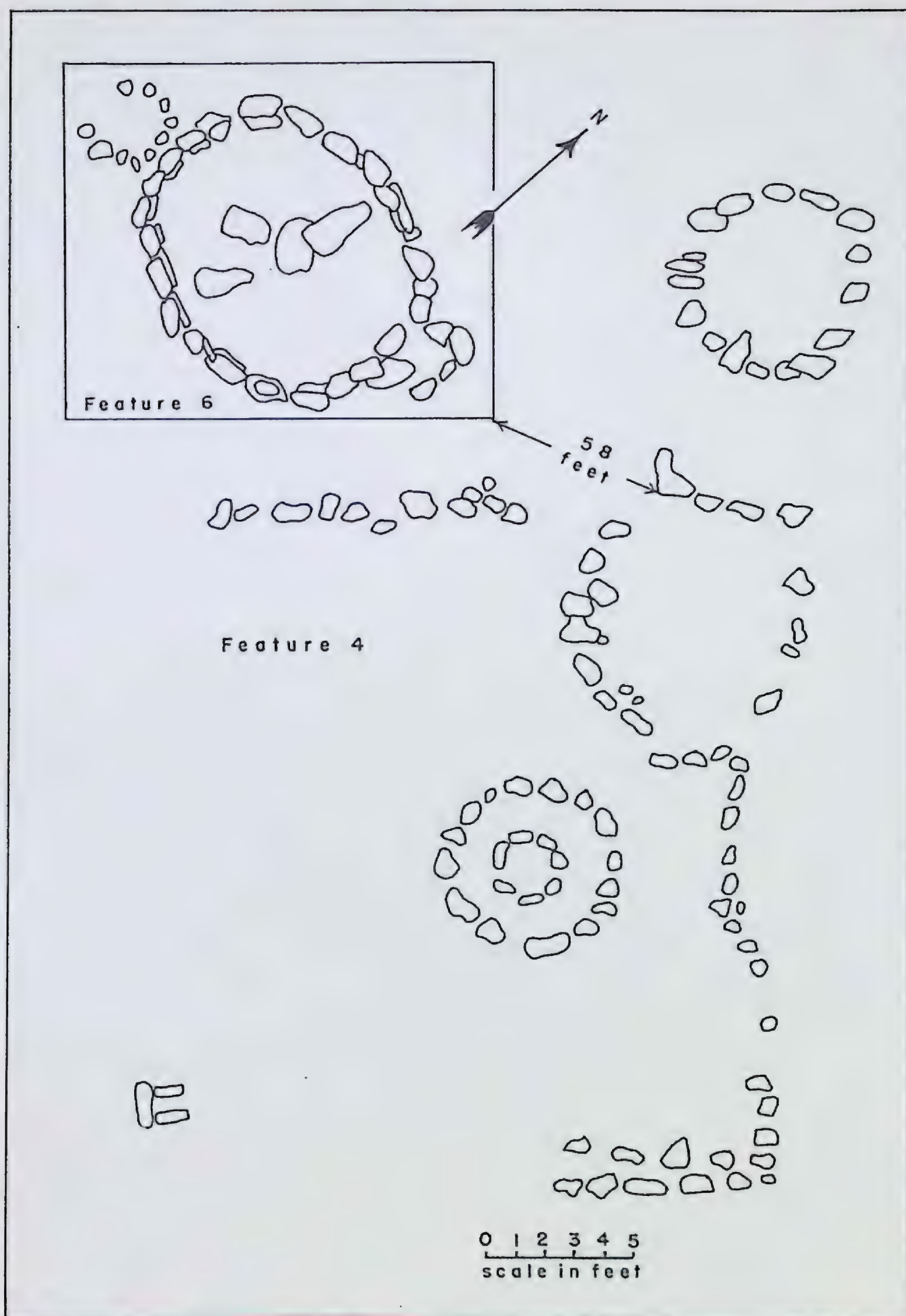


FIGURE 3. F6 and F4, complex of tent rings, stone walls, and fireplace, Site T1At-3, Gilman Delta.

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Feature 4—is a peculiar complex of tent rings and straight lines of small boulders (see Figure 3). One small double ring is either the remnant of a cache or a child's ring. The other two are single courses of small boulders, with no internal features. There were a few animal bones on the surface, but no well-marked midden area. The five artifacts found on the surface were not directly associated with any of the structures. No bones or artifacts were found beneath the surface.

Artifacts. An antler harpoon socket (TlAt-3-3), a small, flat, drilled piece of whale bone (TlAt-3-4), the tip of a bone harpoon point (TlAt-3-5), a scarfed fragment of antler (TlAt-3-6), and two wooden pegs or wound plugs (TlAt-3-7, 8).

Feature 5—is a well-defined ring made of small boulders in a single course, 7 feet in diameter. There is no internal feature, nor were there any associated artifacts.

Feature 5a—appears to be the remnant of a very early house, most of whose structure the river has washed away. Only the southwest wall remained at time of excavation. This was laid up in two courses of large boulders. North of this wall was the deepest accumulation of loam and silt found during the season—6 inches. The stratigraphy here, from bottom to top, was a water-washed sterile sand and gravel at a surface depth of 6 inches, a brown loamy silt to a surface depth of 2.5 inches, an old sod line .5 inch thick, a layer of brown loam from surface depth 2 inches to surface depth one inch, and an inch-thick sod of willow roots and saxifrage. An unusual number of bones, predominantly muskox and fish, were mixed in the brown loam beneath the older sod line. In this organic deposit, possibly the interior of a structure, there were a small fragment of whittled antler shaft at a surface depth of 3 inches, a whale bone composite knife handle at a surface depth of 5.5 inches, and an antler three-pronged fish spear of Dorset type under the bottom boulder of the two-course wall at a surface depth of 6 inches. To the east this small pocket of organic material thinned to a midden 2 to 3 inches deep containing muskox, hare, and fish bones.

Artifacts. Fragment of whittled antler shaft (TlAt-3-10), whale bone composite knife handle (TlAt-3-9), Dorset fish spear (TlAt-3-12).

Feature 6—is a well-defined ring of medium-sized boulders laid up in two courses with inside dimensions of 9.5 and 8 feet. At the west end is a small circle of stones which was apparently an ante-chamber cache. A cluster of large stones at the east end may outline an entryway. There are no interior features, but four large, angular boulders in the centre of the floor cannot be explained. This tent ring is older than others at the site. The wall rocks are buried by 2 inches of gravel, whereas wall rocks of other rings are laid on the present surface.



A. Tent ring F5a, Site TlAt-3, Gilman Delta.



B. Site TkAu-1, House 2, floor partially excavated. East sleeping platform with human and dog bones, tent pole, and comb; cache of tools under platform support, and snow knife in front of support.

Artifacts. Cut piece of whale bone (TlAt-3-1) and drilled and pegged piece of whale bone (TlAt-3-2). Both are parts of a composite knife handle and lay on the floor near the south wall and the entrance.

Feature 8—is an oval tent ring 8 by 4.5 feet which had no associated artifacts or midden.

CACHES

Feature 7—is a large cache 8 feet in diameter built over an old frost crack. Some of the boulders weigh more than 300 pounds, and the structure has the appearance of a grave, but complete excavation failed to reveal anything.

Two other large caches were noted, but not investigated.

FOX TRAPS

Feature 10—is a fox trap covered by a pile of large boulders. The trap is of the familiar box shape, 37 inches long and 9.5 inches wide, floored, walled, and roofed with thin, flat slabs of sandstone.

Gilman West Site (TlAt-1). Two sides of the delta are separated during the month of July by the fast, cold current of the river. In June and August the river is low enough to permit fording. The biological resources of the immediate vicinity appear to be good. Meadows on the high terrace remnants overlooking the delta attract muskox and hares in the summer months, and the protecting valleys contributing to the main river appear to be favoured wintering spots for the muskox. In July and early August, char spawn in great numbers at the mouth of the river. In July, fireweed (*Epilobium latifolium* L.) covers the gravel delta, and its blossoms and leaves could make a welcome salad addition to the diet. In early August, Snow Geese leave the small lakes south of Lake Hazen and congregate on and near the delta prior to migrating south.

We found only one habitation structure on the west side. So much time and effort went into the building of it that it is considered here a winter house, although it is unlike any other in the region. There is also a child's play ring, a double ring 2 feet in diameter, and at least four caches.

HOUSE

Feature 3—is a ring with interior dimensions of 9.1 and 6.3 feet, made of immense boulders, many of which have calculated weights greater than 1,000 pounds. The ring is located in an old channel of the river 5 feet beneath the surrounding terrain. This old channel, obviously dry for many centuries, has been dammed at the lake shore by a very old ice-shove ridge, 7 feet high. A stratigraphic section across the house indicates that the ground on the east side was scooped out from 15 to 25 inches below the then existing surface before the huge house rocks were put in place. The surface at that time was 9 inches below the present

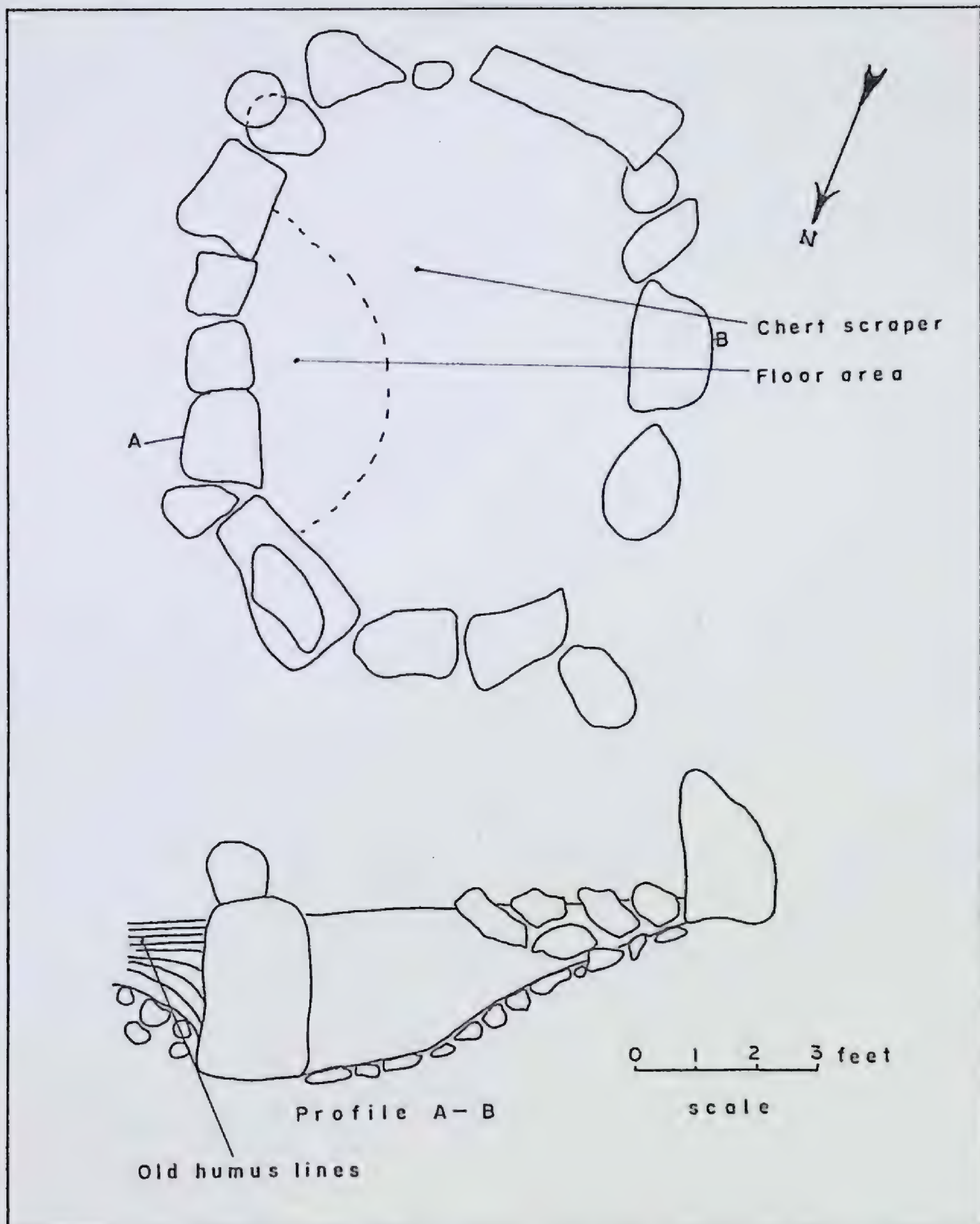


FIGURE 4. Plan view of House F3, Site TlAt-1, west side of Gilman Delta.

surface, and is marked by an organic layer of sod and old rootlets, indicating a more lush vegetation than at present. Wind has filled in the trough outside the east wall with layers of sand interspersed with old sod lines. The interior of the house is filled with wind-blown sand varying in surface depth along the east wall from 34 to 20 inches. This deep area is almost semi-circular, and from here the floor slopes upward to north, south, and west to a surface depth of 9 inches. This sloping area of gravel and small boulders appears to be the sleeping platform. Mixed with this gravel were a number of badly disintegrated animal bones, and one chert end scraper. Some of the upper west wall courses had been pushed inward, presumably by ice-shove.

Artifacts. A chert end scraper (TlAt-1-1).

Midden. Badly weathered and disintegrated hare and muskox bones.

CACHES

Feature 1—is a cache 5 feet in diameter at the southwestern tip of the delta. No associated material was found in excavation.

Feature 2—is a cache 5 feet long and 18 inches wide, 62 feet southwest of the house (Feature 3). Like the house, it is made of huge boulders, some weighing more than 500 pounds. No associated material was found in excavation.

Feature 4—on the northeast side of the delta is a cache 8 by 6 feet, built across a frost crack. The top boulders were too heavy for two of us to move.

Feature 5—near Feature 4, is 6 by 5 feet, and is built across an old frost crack. Both of these structures look like graves, but they cannot be investigated without levers or sufficient manpower.

Boat Haul Site (TlAu-3) is a group of two small tent rings 6 feet in diameter with single course walls near the point east of the east end of John's Island. A surface search produced several muskox bones, a cut muskox rib (TlAu-3-1), and a piece of cut antler (TlAu-3-2). The site was left undisturbed.

T Creek Site (TlAu-4). This inland site is located on a plateau 2 to 6 miles north and east of the lake. Mr. R. Harrington found it late in the season, and I was able to give it only a cursory inspection. Dr. Terris Moore generously enabled me to take photographs from his Piper Super Cub, Lt. (jg) Charles Le Boeuf of the U.S.S. *Atka* flew me over the site in a Bell helicopter, and I spent two hours in the vicinity on the ground. The site is a complex of at least ten tent rings and several caches spread over 4 square miles of uneven highland. Although there are a few small ponds and one intermittent stream near by, it does not seem to be a logical camp-site. The rings are well defined and are made of small

boulders in single courses. One group has three connecting rings; another ring has a well-defined ante-chamber. A line of artificially-placed boulders, 75 feet long, runs up the steep shoulder of a hill facing the bay to the west and seems to mark the site, although it is barely visible from the lake. On the south side, a similar line of boulders, terminating in a cairn or a small cache, lies on the peak of the bluff overlooking the lake and approximately 800 feet above it. We found no artifacts in our cursory inspection of the site, but it certainly warrants more careful attention.

Snow Owl Site (TIAu-2) consists of two tent rings each 6 to 8 feet in diameter, located by Dr. Christie in 1957, but not relocated in 1958. Christie states that the rocks in these rings are extremely large, comparable to those in the house at the Gilman West Site.

Blister Site (TIAv-1) has two small tent rings, 30 feet apart, in small swales atop a large gravel knoll in the centre of the delta. This knoll seems to be the only spot on the delta with rocks large enough to hold down a tent. The walls are laid up in two low courses, but the interiors are so small that the tents could hardly serve for more than one man apiece for a few days. Feature 1 has inside dimensions of 72 by 27 inches, and Feature 2 has dimensions of 64 by 24 inches. I found only one unworked fragment of caribou antler, two caribou bones, and no artifacts associated with the rings.

Super Cub Site (TkFa-1), Turnstone Site (TjFb-1), and Cobb River Site (TjFa-1). All were located in an aerial survey but not visited on the ground. The first of these three sites has one large, round tent ring with a three-course wall; the second has one small tent ring built of very large rocks, and the third appears to have only three meat caches on the ridge several hundred feet south of the shoreline.

Peary Site (TIA5-5) at the extreme east end of the lake is unquestionably the 1906 winter quarters of the Etah Eskimo hunters for Peary's party. Here, two winter houses of local flat sandstone slabs are surrounded by tin cans, stoves made of oil cans, and a coal scuttle, iron pokers, sawed caribou antlers, oak sledge upstanders, and dog whips, and quantities of muskox bones. All of the associated artifacts were of European manufacture, but the architecture of the houses has interesting similarities to the prehistoric houses of the vicinity. The western of the two houses, excavated completely, is identical to older prehistoric houses. The side walls in two courses rise less than 2 feet, serving only to hold down a canvas tent. The interior, 7 by 10 feet, is completely paved, with the rear half raised 6 inches to form a sleeping platform 6 by 7 feet. Opposite this platform, at the end of the long axis of the house, is a floored and walled cold-trap entrance, 5 feet long and 30 inches wide, with no lintel over the entrance. Since the house was built on the edge of a silt bank, the end of the entryway is 2 feet below the main floor. A pocket of charred bones and grease to the left of the doorway in the living area marks the location of the cooking lamp or, in this case, the tin can stove. The eastern house is more pretentious; the walls rise to 3 feet above the ground with many courses of flat slabs. Several slabs at the top of the

walls cantilever inward to form roof supports. The total interior length of this house is 17 feet. The sleeping platform at the north end is 7 by 7 feet and raised one foot above the living area. The living area is approximately 5 by 6 feet with a cooking alcove 2 by 4 feet at the east end and a cooking alcove 4 by 5 feet at the south end. The entryway, floored and walled for a distance of 13 feet, is 30 inches wide and meets a slight dip in the floor at the west end of the living area. The entryway floor is 10 inches deep where it meets the side wall, leaving only 20 inches between the floor and the top of the lintel at the doorway. Halfway along the entryway the floor dips to 20 inches below living floor depth, then rises again; but since the ground slopes to the west, the front of the entryway is actually 28 inches below the house floor level.

Muskox skins covered the sleeping platforms in both houses, and the floors were littered with scraps of canvas, worn-out kamiks and mittens, and pieces of wood and metal.

Along the south side of the lake there are two poorly defined tent rings, one opposite the west end of the larger of two islands near the eastern end of the lake (TlAt-7) and the second on a west-facing point (TlAt-4), 7 miles west of here. There were only a few bones, and no artifacts associated with the rings.

Somewhere between these two points, Greely (Greely, 1886, Vol. I, p. 376) reports a site of four tent rings with associated bones, five pieces of worked whale bone and a sled cross-piece, and two bone shoes for sled runners near by, half-buried in the sandy beach. We were unable to locate this site either on foot or from the air. Due south of Site TlAt-7 (Greely's Camp 4) there is a fox trap overlooking the lake.

Ruggles Outlet Site (TkAu-1), the location of the only definite prehistoric winter houses on the lake, produced the richest cultural assemblage of the season. The site presently consists of two winter houses and a summer tent ring, with associated stone box cache on the west side of the river. In 1882 Greely reported three well-defined rock slab houses on the east bank of the river, but a change in stream channel has left no trace of them.

TENT RING

Feature 1—The outline of this ring was indistinct. The prehistoric inhabitants had moved many of the large wall rocks, and members of Greely's expedition had moved others in July of 1882. Apparently the ring was approximately 9 feet in diameter, built of large rocks in a single course, with no internal features. The unprepared gravel floor, under a 2-inch mat of dense willow roots, was well marked with a dark brown humus and quantities of animal bones. The partial skeleton of an elderly human (male?) lay under large boulders at the south end of the house. Other human bones lay scattered throughout the house, under the sod and under tumbled wall rocks. Seventy yards west of the tent ring, a bleached human left tibia lay where it had been dropped by either a wolf or fox. The bones *in situ* indicated that the individual had been placed in semi-flexed position on his

right side, and a few wall rocks rolled over the body to protect it from wolves. This attempt was only partly successful; the shoulder girdle, feet, and ankles were protected, but either wolves or foxes had scattered some bones and dragged others away.

Artifacts. Cut antler tines (TkAu-1-41, TkAu-1-42), soapstone lamp fragment (TkAu-1-43), drilled antler pot hook (TkAu-1-44), broken ivory tip (TkAu-1-45), broken antler tip (TkAu-1-46), carved, broken ivory pendant (TkAu-1-47).

Midden. Quantity of land animal, bird, and fish bones. In order of quantity these are hare, muskox, caribou, fox, goose, and char.

Human skeletal remains. Left tibia, left humerus, right radius, right ulna, left and right scapulae, right clavicle, left and right ankle and foot bones, three metacarpals, upper central incisor, lower central incisor. All epiphyses had closed long before death, and the scars had been obliterated; pronounced wear and some lipping on joints, teeth worn down nearly to gum line.

HOUSE

Feature 2—This house had been built and rebuilt at least three different times. In spite of the fact that later inhabitants had altered the position of wall rocks and floor slabs, and that lake-ice, wave action, and solifluxion had dislodged parts of the structure at different points in its history, it was possible to identify parts of these three stages. Briefly the history of the house is this: building stage 1 started when the ground surface was only 13 inches above the present lake level (520 feet above sea-level). The builders scooped out a shallow floor area 3 inches beneath the surface, paved it, lined it with vertical slabs, and placed sleeping platform slabs at both ends of the house on supporting rocks 2 inches high. Lake storms had built up a low gravel ridge along the locus of the south side, about 20 inches above the north side, and since the wall rocks for holding down the skin roof were placed on the existing surface, the structure had the appearance of a partial pit house. Sometime later, waves washed 8 to 18 inches of gravel into the abandoned house, while solifluxion in the silt behind the south wall pushed the wall toward the north, both actions having the effect of making the house smaller and deeper. In the second building stage, the inhabitants scooped the loose gravel from some of the floor and sleeping platform areas, laid a few floor slabs on top of the midden and gravel overlying the earlier floor, and added their sleeping platform foundation rocks and slabs over the gravel on the old one. They did not extend the sleeping platforms as far toward the walls, and only scooped out some of the gravel; so the smaller platforms are now tilted upward at the walls. Between the abandonment of stage 1 and the building of stage 2, a frost crack, underlaid by a dike of clear, perennially frozen ice, split the house area laterally. This crack ran the length of the entryway, tilting the floor slabs of stage 1 inward and downward, and opening a

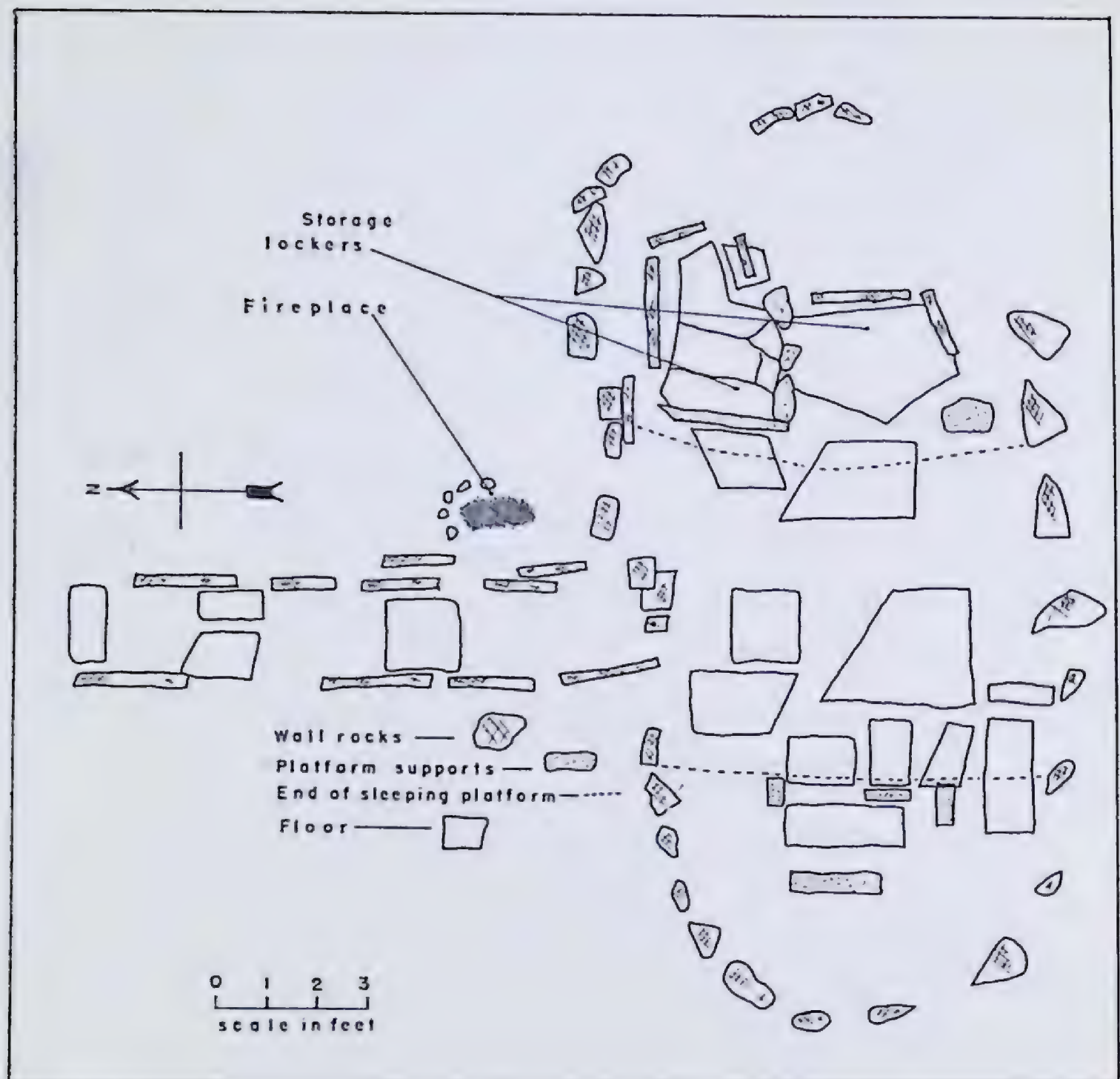


FIGURE 5. Plan view of the first building stage, Occupation 1, House 2, Site TkAu-1, Ruggles Valley.

natural chamber with an ice floor in the south wall opposite the entryway. The stage 2 builders levelled out the floor with flat slabs over the debris-filled crack and lined and roofed-over the natural ice chest in the south wall. Again the house was filled with wave-washed gravel in a layer 3 to 4 inches thick; the wave-formed gravel ridge built up on the north side to 17 inches above the house floor level, and the rolling silt bank on the south pushed the wall inward, leaving an interior elevation of 33 inches along the south side. The builders of stage 3 scooped out little of the gravel, placed their outer wall blocks outside of the slumped south side and the ridged north side, but left the walls sloping inward. They placed a few floor slabs on the old ones and built inward-slanting sleeping platforms on the gravel at both ends of the house. Sometime later, the inhabitants sealed off the west end with a low wall just west of

the entryway and the meat locker, and used the west end for storage. At this time the small house was roofed with a skin supported by a 9-foot pole in front of the entryway, and a 3-foot pole behind the sleeping platform. Still later, presumably after roots and sod had covered the artifacts left on the west end storage chamber, the west end was converted to a meat cache, which at time of excavation contained a very old muskox skull.

Building Stage 1—Presumably this is the first occupation of the site, although the floor was permanently frozen when exposed on August 4, and seven days later bright 24-hour sunlight had only thawed the top half-inch. Future research in the area should include testing the water-washed gravel beneath floor 1. The house has been left open for this purpose.

When exposed, the floor on the north side was 17 inches beneath the present surface, and on the south side 33 inches beneath the present surface. The structure is a double house, 18 feet 6 inches long and between 7 and 8 feet wide, with sleeping platforms on east and west ends and a floor between. The entryway runs due north from a point a little west of the midline of the house, and is 11 feet long, 3 feet wide, and judging from the depth of the sandstone slabs lining the sides, was originally 26 inches deep, but had filled up with 3 inches of debris before the abandonment of the house. The east end of the house had interior walls of vertical sandstone slabs, with a walled-in stone box, probably for storage, 4 feet 6 inches long and 2 feet 6 inches wide, running under the sleeping platform in the northeast corner. This box, carefully floored with slate, and a slate-floored storage compartment 3 by 3 feet south of it, had been carefully lined with a layer of moss $1\frac{1}{2}$ to 2 inches thick, which was frozen when exposed and contained bits of wood as well as some flesh and hair of muskox and hare. Both boxes are under a sleeping platform 4 feet 6 inches long, 6 feet 6 inches wide, and 4 inches above the floor of the central area (12 inches above the floor of the storage box) and partially support it. The west end of the house has no such vertical wall slabs or storage chambers. It consists of flat sandstone slabs forming a sleeping platform, 4 feet 6 inches long, 7 feet wide, supported on rectangular stone blocks 2 inches high. The central paved area is 7 feet long and 6 feet 6 inches wide, with the platforms for cooking lamps probably against the south wall, as was the case in the second and third habitation periods. Just outside the north wall and along the east side of the entryway is a small fireplace of round cobbles surrounding an area of charred fat 1 foot wide and 2 feet long. This burned area is 3 inches above the level of floor number 1, 14 inches beneath the present gravel surface, and is probably related to the first building stage.

The second group of builders to occupy the house filled up the northeast storage box with rocks to provide a firm foundation for their east sleeping platform; so presumably the contents belong to stage 1. From the amount of organic debris, which had

FIGURE 6

1. Fragment of seal probe (TkAu-1-89).
2. Unworked amber nodules.
3. Fragments of soapstone bowl (TkAu-1-52).
4. Bow brace (TkAu-1-93).
5. Sled runner (TkAu-1-125).
6. Seal-towing toggle (TkAu-1-51).
7. Seal-towing toggle (TkAu-1-50).
8. Wooden sled slat.
9. Side barbs of salmon spear (TkAu-1-61, 62).
10. Knife handle (TkAu-1-23).
11. Broken tip of snow knife (TkAu-1-63).
12. Fish stringing needle (TkAu-1-64).
13. Snow beater (TkAu-1-81).
14. Fish stringing needle (TkAu-1-57).
15. Iron-bladed knife (TkAu-1-79).
16. Narwhal tusk ice-hunting harpoon (TkAu-1-77).
17. Caribou astragalus drill socket (TkAu-1-94).
18. Tent ring, Feature 1.
19. Bone comb (TkAu-1-4).
20. Human humerus.
21. Human scapula and ribs.
22. Dog ribs.
23. Antler pail handle (TkAu-1-8).
24. Wooden harpoon fragments.
25. Ivory needle case (TkAu-1-2).
26. Ivory thimble holder (TkAu-1-3).
27. Snow knife toggle button (TkAu-1-38).
28. Snow knife (TkAu-1-37).
29. Whale bone snow probe (TkAu-1-35).
30. Charred antler needle case (TkAu-1-122).
31. Knife handle (TkAu-1-91).
32. Antler nail (TkAu-1-120).
33. Fragment of soapstone bowl (TkAu-1-52).
34. Ivory sinew twister (TkAu-1-119).
35. Antler side scraper (TkAu-1-5).
36. Dog ulna.
37. Human radius.
38. Puppy skull.
39. Harpoon socket (TkAu-1-19).
40. Fish stringing needle (TkAu-1-25).
41. Dog vertebrae.
42. Amber beads (TkAu-1-30).
43. Cache of tools.
44. Ulu (TkAu-1-80).
45. Fragment of sled runner (TkAu-1-71).
46. Meat stick (TkAu-1-92).
47. Fragment of antler sled slat (TkAu-1-16).
48. Fragment of snow knife (TkAu-1-33).
49. Harpoon foreshaft (TkAu-1-22).
50. Antler nails or pegs.
51. Charred area—lamp platform.
52. Human femur.
53. Narwhal ivory tube (TkAu-1-40).
54. Wooden and antler fish spear (TkAu-1-68).
55. Muskox tibia scraper (TkAu-1-36).
56. Cache of tools.
57. Bone comb (TkAu-1-118).
58. Charred fireplace area.
59. Scarfed bone and antler projectile points.
60. Narwhal ivory draught toggle (TkAu-1-116).
61. Dog trace toggles (TkAu-1-74, 75).
62. Knife handle (TkAu-1-90).
63. Soapstone bowl (TkAu-1-126).
64. Sled runner (TkAu-1-39).
65. Bone comb (TkAu-1-76).
66. Whale-bone sled slat (TkAu-1-78).

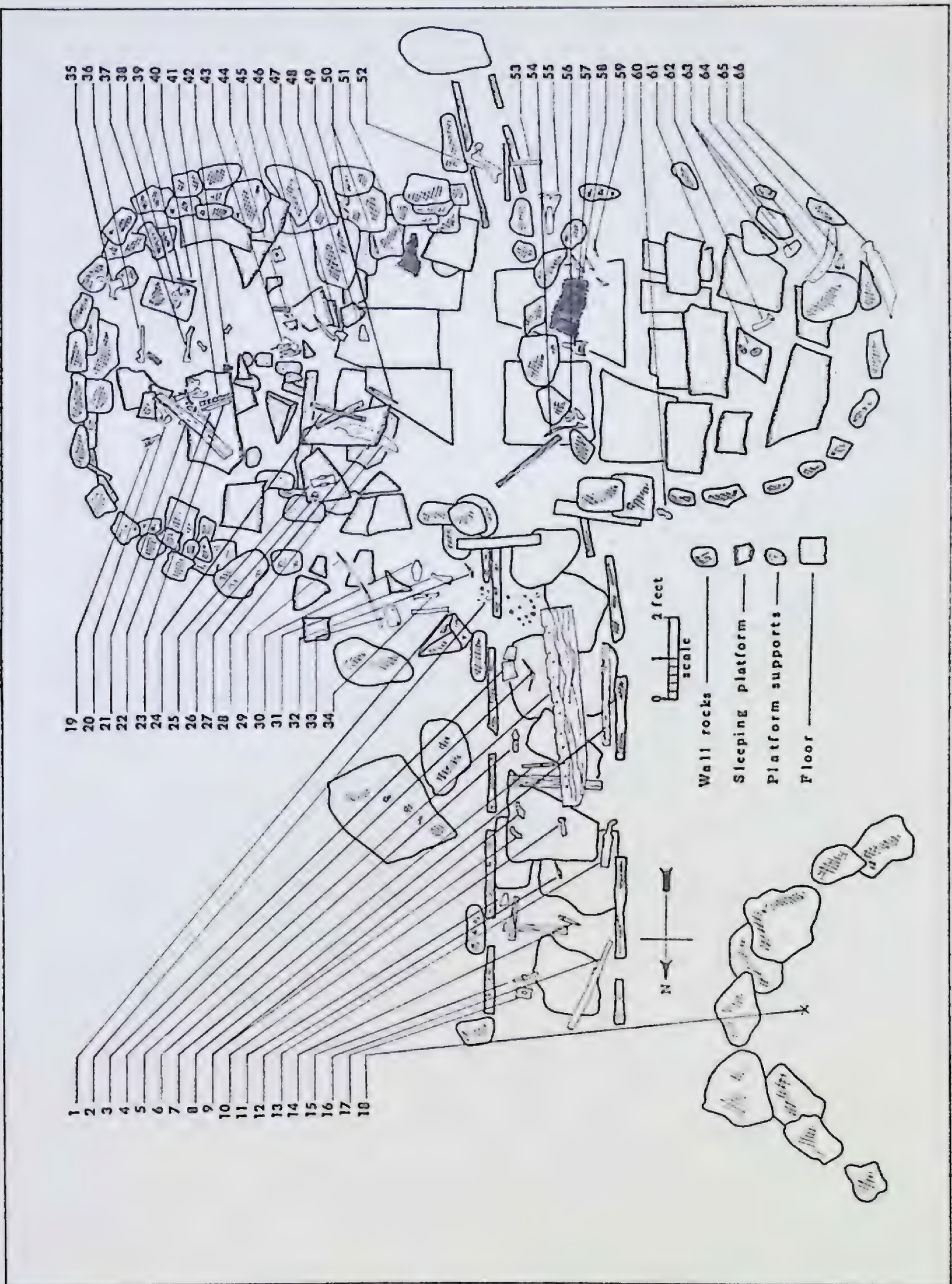


FIGURE 6. Plan view of the third building stage, Occupation 3, House 2, Site TkAu-1, Ruggles Valley.

filtered through cracks in the stage 1 sleeping platform, it would seem that the first inhabitants occupied the house for a long period of time. On the floor of this box, next to the moss covering, a muskox scapula and a caribou scapula lay crossed, as if placed deliberately. Both had been used as shovels, probably in scooping out the house interior. Also in the box, along with quantities of hare, muskox, caribou, goose, and fish bones, were a small ivory drill socket (TkAu-1-9), an antler projectile point (TkAu-1-10), a soapstone lamp patch (TkAu-1-21), a drilled antler button (TkAu-1-32), a wooden firedrill (TkAu-1-34), and the split vertebral segment of a muskox, possibly part of an adze socket (TkAu-1-95). These artifacts indicate that the earliest inhabitants had a Thule cultural assemblage. Other artifacts in the house attributed to this first stage because of their position under the lowest floor, or sleeping platform, are—the rim of a wooden bucket (TkAu-1-11), a scarfed-tang bone projectile point (TkAu-1-28), a drilled antler fragment (TkAu-1-73), and an antler knife handle (TkAu-1-104), all found in the permafrost at the bottom of the frost crack in the central floor area; half of a wooden lance socket (TkAu-1-12), an unfinished ivory knife handle (TkAu-1-72), and two pieces of cut antler (TkAu-1-114, TkAu-1-123), all from the bottom floor in the entryway; a split whale bone ulu handle (TkAu-1-17), and the other half of the wooden lance socket (TkAu-1-67) from the floor under the lowest east sleeping platform; and an antler meat hook (TkAu-1-65), an unworked polar bear canine (charm?) (TkAu-1-82), and a worked ivory splinter (TkAu-1-98), all under sleeping platform 1 or the support rocks of sleeping platform 2 on the west side; and a second wooden firedrill (TkAu-1-14) behind a north wall rock near the floor.

Building Stage 2—Understandably, this building stage is not so well defined as either the initial or the final building stage. However, some of the floor slabs in the entryway and some of the wall rocks can be identified with this stage. Most easily identified are the sleeping platforms on both the east and west ends, and the new sleeping platform foundation rocks added at this time. These lie on top of a 2- to 4-inch layer of midden debris, and a 6- to 8-inch layer of sterile gravel over the stage 1 sleeping platform. Although stage 1 and stage 2 are separated in some places, such as against the south wall, by as much as 18 inches of gravel, later inhabitants apparently scooped away the accumulation of gravel on the floor area in front of the sleeping platform, since all three floors fill a vertical space of only 3- to 4-inches. During stage 2, the interior area retained approximately the same dimensions as in stage 1, but was shifted 6 inches to one foot northward away from the slumping north wall. The clearest stratigraphic separation between the two stages is between the stage 1 and stage 2 sleeping platforms where the stage 2 sleeping platform slabs are 6 inches above those of stage 1.

The builders of stage 2 levelled out the frost crack across the floor, which followed the abandonment of stage 1. Since midden

material had washed into the now V-shaped floor 1, as much as 12 inches of cultural material was sealed off at the centre of the floor crack. These builders also lined the ice-floored chamber on the north wall. Artifacts that can be ascribed to this period with some certainty are a fragment of wooden fire hearth (TkAu-1-13), a split ivory snow-knife tip (TkAu-1-29), one amber bead (TkAu-1-100), and an antler peg (TkAu-1-117), all found in or behind the south wall; a fragment of an antler sled cross-slat (TkAu-1-16), an antler fish spear side barb (TkAu-1-87), an antler meat stick (TkAu-1-92), and a fragment of a whittled antler shaft (TkAu-1-96), all from the cooking area against the south wall just east of the cold locker; a whale bone snow beater (TkAu-1-81) and an antler knife handle (TkAu-1-91) in the entryway; a split antler knife handle (TkAu-1-24) on the floor in front of the east sleeping platform; a carved ivory tension piece (TkAu-1-27) under the east sleeping platform; and an ivory dog-trace toggle (TkAu-1-113) lying on the west sleeping platform.

Building Stage 3 began long enough after the abandonment of the stage 2 house to allow 4 inches of gravel and a sod layer to build up to a present surface depth of 7 inches. The top of the stone wall was pushed outward, leaving interior dimensions of 19 by 9½ feet at the east end, but there seems to have been little attempt to straighten the side walls; consequently, the east and west sleeping platforms are now smaller (5 by 5 feet) and slant from a surface depth of 15 inches near the east wall to a surface depth of 21 inches at the front of the platform. The slant of the west platform is nearly as great. New sleeping platform supports were put in, so that both platforms are now 5 inches above the central floor, which is 30 to 33 inches beneath the present surface. The entryway had filled up with debris to the point that there was now only 18 inches between the floor and the bottom of the lintel, but new floor slabs were put in with no attempt to deepen the entry. At this time the entryway was apparently roofed with the wooden side runner of a dog sled 7½ inches wide, 2 inches thick, and 62 inches long, running longitudinally over the entry, and sled cross-slats and wooden shafts running crosswise. The inhabitants at this time built a small storage antechamber, 3 feet wide and 4 feet long, against the east wall of the entryway, which opened into the central area of the house. After using the west sleeping platform for a while, possibly after the inhabitants were reduced to one family, the west side of the house was walled off, and dog sled equipment, extra combs, a stone bowl, and spare knife handles were stored on the old sleeping platform. The living area of the house was now 9 by 10 feet, although presumably the west storage area was covered by skins, since the top of the new west wall was used for a cooking area, and tools were cached in a pocket behind the wall. The cooking lamp apparently stood on the same platform against the south wall just east of the cold locker, as it had since stage 1 times. These occupants also relined the cold locker and put in new floor slabs on the central floor. They lived here long:



A. Site TkAu-1, House 2, west sleeping platform after removal of cache rocks. Broken soapstone bowl at rear, sled-shoe at right, dog toggle and knife handle at left.



B. Site TkAu-1, House 2, after excavation of east side. West sleeping platform to rear, entryway to right.

enough to accumulate 4 to 6 inches of midden on the floor, and 1 to 2 inches of debris on the sleeping platform, and then, apparently, tragedy struck. Over the midden on the east sleeping platform lay parts of the shoulder and arm bones of an individual 18 or 19 years old, from the condition of the epiphyses. Near these human skeletal fragments were bones of dogs, and the skull of a very young puppy. Lying over these bones, in sequence, were—a thin layer of water-washed gravel; wall rocks pushed inward from the east wall; flat roof slabs over these; and a 4-foot-long coniferous wooden pole on top of the slumped wall and roof rocks. Over the wooden pole was a dense 2-inch mat of willow roots and silt.

It would appear that the last inhabitants occupied the small, but comfortable house for several winter and summer seasons, moving into the adjacent skin tent during the warmest months. They successfully bagged quantities of muskox, caribou, hare, geese, ptarmigan, fox, and char. If they made the two-day sledge trip to the fiord for sea mammals, they brought none of the joints back, although many of their tools were made of whale bone, narwhal horn, and walrus ivory. There were no remains of polar bear or wolf. Their wealth in wood was such that the two 6-foot runners of the dog sled were solid planks, and they could afford to burn chunks of driftwood in the open fire on the west wall fireplace. Here they broiled rabbit and char, boiling the rest of their meat over the lamp which stood against the south wall. One of the occupants died and apparently the survivors (or survivor), in order to protect the body from the wolves, dragged it to the summer tent where they rolled rocks over it, but this was not wholly successful. Another inhabitant, possibly the only survivor, then appears to have eaten the last of the sled dogs and then lay on the sleeping platform, and presumably starved to death. The high skin tent (Greely found a pole 9 feet long and 2 inches in diameter in the centre of the house) remained standing in some places, protecting the body from the wolves, until after a lake storm had washed gravel over the house, shifting the right femur to the ice chamber where it lodged upright, and pushing wall and roof supports over the platform. Only then did the 4-foot post over the sleeping platform fall over the slumped wall rocks.

Later use. There were no later building stages, but there are indications that tents were pitched over the house after a willow root sod had covered it. The west storage room was converted to a meat cache long after the death of the stage 3 builders. Peary's Eskimo hunters appear to have pitched a canvas tent over the house in 1906, leaving part of the tent, a cut caribou antler, muskox horns with the tips sawed off, tin cans, and sawed boards.

Artifacts. Specimens TkAu-1-1 to TkAu-1-123, except where otherwise attributed to specific building stages.

Midden. Two- to 8-inch accumulation of hare, muskox, caribou, bird, and fish bones, in that order of quantity inside the house, and extending in front of the north side of the house for 10 feet.



Site TkAu-1, House 2 after excavation of east side. East wall and storage lockers under east sleeping platform.

Skeletal remains. Right femur—epiphysis of caput closed, greater trochanter recently closed, lesser trochanter closed, distal epiphysis closing. Right humerus—proximal epiphysis recently closed, distal closing. Left scapula. Left ulna—proximal epiphysis closed, distal open. Left radius—proximal epiphysis closed, distal open. Right radius—proximal epiphysis closed, distal open.

Lt. A. W. Greely first discovered this house in June, 1882, and although his sketch is inaccurate (Greely, 1886, Vol. I p. 382), and the account of artifacts found is confusing, some of his remarks are pertinent. Greely and four men spent approximately an hour overturning rocks and digging in the house with split tin cans, but apparently did little damage. The most extensive excavation appears to be a narrow trench through the north ante-chamber along the east wall of the entryway, and in the centre of the house. Here, and in the vicinity, he found forty pieces of wood and worked bone, including one large and two small narwhal horns, two ivory toggles for dog traces, an arrowhead, two bone handles, an iron-bladed ulu, a polar bear canine, whale-bone shoes for the runners of two sleds, a wooden upstander with carefully fitted bone ferrule, several sled slats of wood and whale bone, a pine wood pole 9 feet long, parts of two badly rotted sledge runners, and one complete wooden sledge runner in good condition, 5 feet long, 9 inches wide, and over 2 inches thick.

HOUSE

Feature 3—This house, 10 feet in diameter, with a north-facing entry-way, lies 25 feet east of Feature 2. The present appearance is of a very shallow circular pit, with no wall rocks on the surface, but I feel reasonably certain that a floor and sleeping platform lie several inches under the present surface of washed gravel. Time did not permit any excavation of this house, and I was reluctant to disturb it by testing for the buried floor.

CACHES

Feature 4—is a small rectangular box 4 feet long and 18 inches wide, made of stone slabs set in the ground. It is 6 feet east of Feature 3.

Feature 5—also a sunken box lined and floored with stone slabs is 6 feet long, 18 inches wide, and is 12 feet east of Feature 4. Both boxes were empty when found. Greely had excavated Feature 5 and found only a small piece of unworked bone.

TRAPS

One mile due south of the houses is a stone box-trap on the top of the highest hill in the vicinity. The trap is built exactly like the fox traps previously described, but is much larger—8 by 2 feet—and presumably was built for wolves. Dr. Roger Deane found a similar "wolf trap" surrounded by unworked muskox bones 12 miles down the Ruggles Valley (Site TkAt-2).

Tent Flap Site (TkAt-1), halfway down the Ruggles Valley and 2 miles north of TkAt-2, has a rock cache prominently placed on the edge of a bluff on the east side of the river. The cache was empty when found. Six feet east of the cache is what appears to be a partially floored tent ring 6 feet in diameter with no associated artifacts or midden.

DESCRIPTION OF ARTIFACTS

Harpoon heads

Arctic archæologists have established a careful seriation of harpoon styles, useful in sequence dating. In this light, it is discouraging to have recovered such a small sample from northeastern Ellesmere. Since Greely also reports only one harpoon head (apparently Dorset) (see Figure 9g), this dearth might be thought symptomatic of a lack of importance of marine mammal hunting. However, at the Lonesome Site, the only sea-coast site with any quantity of animal bones, there are a significant number of seal bones, although they rank third behind hare and caribou.

This site produced two toggle harpoon heads, similar to Mathiassen's Thule type 5 (Mathiassen, 1927); of the type described by Holtved (Holtved, 1944, p. 192) as flat, with closed socket. TjAq-1-33 (Plate IX, fig. 1) from the surface outside tent ring F29, made of antler, has two dorsal, cleft spurs. The line hole curves downward slightly on both sides.

The drilled socket hole projects upward into the body, technically making it a closed socket, although much of the socket is actually open. On either side of the open part is a small, drilled lashing hole connected by a channel on the dorsal side. The blade slot is parallel to the line hole and appears to have once held a pegged iron blade, but the tip of the head has been cut off with a series of drilled holes. The head is 7.4 cm long, 2.6 cm wide, and 1.4 cm thick. The socket hole is .69 cm in diameter, the line hole is .62 cm in diameter, and the lashing holes .3 cm in diameter. The blade slot is 1.3 cm long and .2 cm wide.

TjAq-1-56 (Plate IX, fig. 2), also of antler, from the interior of the "autumn house" F31, is of the same type, but the socket is more completely closed, and there are no side lashing holes. Like TjAq-1-33, the tip has been cut off with a drill at the level of the peg hole. It is 7.1 cm long, 2.6 cm wide, and 1.8 cm thick. The socket hole is .9 cm in diameter, the peg hole .33 cm, and the drill holes cutting through the tip .27 cm in diameter. The blade slot, which appears to have taken an iron blade held with a bone pin, is .19 cm long and .25 cm wide.

A small narwhal ivory harpoon dart head, TjAq-1-38 (Plate IX, fig. 3) comes from the same site, and was mixed with the animal bones of Midden V. It is crude and has no separate blade but is bevelled from both sides to form a self-bladed head, parallel to a small, drilled, and reamed line hole. The small, tapered socket hole is partly open, and there is a crudely-cut groove for a lashing line around the dorsal surface. It is 6.1 cm long, .8 cm wide, and .5 cm thick. The line hole is .3 cm in diameter, and the socket hole is .4 cm in diameter.

The Ruggles Outlet Site produced only an unfinished antler harpoon head, TkAu-1-69 (Plate IX, fig. 5), found in a small cache of artifacts in House 2. This cache lay behind one of the wall rocks used to seal off the west end of the house late in Occupation 3. It seems probable that the finished head would be of Mathiassen's type 4, described by Holtved as a thin toggle harpoon head with closed socket, more or less angular cross-section, strong dorsal spur, and blade at right angles to the line hole (Holtved, 1944, p. 190). It is 9 cm long, 2.1 cm wide, and 1.2 cm thick.

The antler fish-harpoon head, TkAp-1-1, from Basil Norris Bay (Plate IX, fig. 4) is certainly Dorset in type. It is bilaterally symmetrical with four pairs of matching barbs, and it tapers at both ends; the tip is bevelled dorsally and ventrally on both edges to form sharp blades. It is 11.4 cm long, 1.2 cm wide at the widest point, and .45 cm thick. The diamond-shaped line hole has been gouged rather than drilled and is .7 cm long and .3 cm wide. It is significant to note that this is the site on which Greely found the Dorset harpoon head.

Harpoon foreshafts

Two walrus ivory foreshafts from the Ruggles Outlet Site are the only ones found during the season. TkAu-1-1 (Plate IX, fig. 6) was a surface find on the gravel shingle outside of House 2. It is rectangular in cross-section, with a rounded, but not tapered base, tapering at the tip to a blunt, rounded point. Both edges are deeply grooved with a wide, V-shaped groove .25 cm deep, resembling to some degree vestigial slots for side blades. The rectangular line hole, which ends .8 cm from the butt

end, has been chiselled, rather than drilled or gouged. It is 12.9 cm long, 1.4 cm wide at the widest point, 4 cm above the butt end, and 1.3 cm thick at the butt. The chiselled hole is .65 cm long and .2 cm wide. TkAu-1-22 (Plate IX, fig. 7) from the Occupation 3 floor of House 2 also has a rectangular butt and tapers to a narrow, oval point. The butt end once had a carved decoration, but it was broken off long before the foreshaft's usefulness came to an end. The carving remnant now looks like a pair of ears or a pair of bent arms. Like TkAu-1-1, the line hole, which ends .2 cm from the butt, is rectangular, .85 cm long and .2 cm wide. It is 15 cm long, 13 cm wide at the middle, and .8 cm thick at the butt.

The only similar artifact in the literature is a marline spike of approximately the same length with a rectangular suspension hole illustrated by Holtved (Holtved, 1944, Pl. 29, No. 13) from an early house in Inglefield Gulf (Inuarfigssuaq, House 5). A marline spike with a carved butt end from the Inugsuk Site (Mathiassen, 1930, Pl. 7, No. 16) suggests that the Ruggles artifacts, though thick, should be considered marline spikes rather than foreshafts.

Harpoon sockets

TjAq-1-55 (Plate IX, fig. 8) from outside the east wall of F31, Lonesome Site, is a short, cylindrical, antler socket, pinned through a wooden shaft by a wooden pin. There is a large line hole in the fragment of wooden shaft found in the socket. The socket is 4.2 cm long and tapers slightly toward the shaft end, being 3.2 cm wide, 2.8 cm thick at the foreshaft end; and 2.8 cm wide, 2.6 cm thick at the wooden shaft end. The foreshaft socket, 2 cm deep, also tapers from 1.5 cm by 1.3 cm at the top to 1 by 1 cm at the bottom. The shaft socket is 2.2 cm deep and 2.2 cm in diameter. The peg hole is .45 cm in diameter. The fragment of wooden shaft, 3.5 cm long, is tenoned at the end and drilled 1.5 cm below the socket with a 1 cm diameter line hole.

TkAu-1-19, also of antler (Plate IX, fig. 11), comes from the top of the eastern Occupation 3 sleeping platform of House 2, Ruggles Outlet Site. It is short and cylindrical, with no peg or line holes, but with areas on both faces (probably tines), which have been worked smooth with a drill. It is 5 cm long, 3.9 cm wide, and 3 cm thick at the foreshaft end, with a rounded oval socket 1.7 cm deep; and 3.2 cm wide by 2.8 cm thick at the shaft end; with a gouged-out socket 1.9 cm by 2.2 cm and 2.8 cm deep.

TLAt-3-3 from the surface of F4 on the Gilman East Site (Plate IX, fig. 9) is a heavy, deeply weathered socket, probably of antler, rectangular in cross-section at the foreshaft end, and scarfed and drilled for four peg holes at the shaft end. The foreshaft socket hole is oval, 1.8 by 1.3 cm and is 1.9 cm deep. A drilled hole .9 cm in diameter passes through the middle of the socket. It is 13.6 cm long, 3.9 cm wide, and 2.5 cm thick at the foreshaft end. The four peg holes on the scarfed end are all .5 cm in diameter.

Harpoon finger rest

TkAu-1-70, of antler (Plate IX, fig. 10), comes from the cache of artifacts hidden behind one of the rocks used to seal off the west end of

House 2, Ruggles Outlet Site, late in Occupation 3. It is 5.1 cm long, 2.2 cm wide, and 1.2 cm thick at the top. The edge that fits against the shaft is slightly concave, and there are three lashing holes .35 cm in diameter.

Harpoon ice picks

TjAq-1-81, of antler (Plate IX, fig. 13), comes from F35 on the Lonesome Site. It is simply an antler tine 11.7 cm long and 1.4 cm wide, ending in a round blunt point, and scarfed and roughened at the shaft end. TlAt-3-6, also of antler, from F4 on the Gilman East Site, appears to be the scarfed fragment of a similar ice pick.

Seal towing gear

TkAu-1-51, of whale bone (Plate IX, fig. 14), from the Occupation 3 floor of the entryway of House 2, Ruggles Outlet Site, appears to be either the neck or the navel piece of the seal-towing gear. It is squared at the butt, and slightly bevelled dorsally and ventrally to form double blades at the point. The hole nearest the point on the ventral side is reamed larger to accept a knot, and the two holes are inset with a deep channel on the dorsal side. It is 8.9 cm long, 1.8 cm wide, and 1 cm thick at the butt; the holes are .6 cm in diameter, and the artifact is deeply saturated with grease. TkAu-1-50, also of whale bone (Plate IX, fig. 16), from the same find spot appears to be the nostril piece of a seal-towing gear. It is 19.5 cm long, 1.4 cm wide, and 1.2 cm thick, rounded at both ends with a slight chisel blade at the shorter end. A line hole .4 by .8 cm (drilled twice) passes from edge to edge 7.3 cm from the shorter end. TkAu-1-73, of antler (Plate IX, fig. 15), from under the slumped floor slab of Occupation 1 entryway, House 2, is much cruder but is deeply saturated with grease and has a high use-polish. It appears to be a fragment of a towing piece.

These artifacts seem out of place in the assemblage from House 2. Holtved does not report the nostril pin from the Thule or Inglefield Gulf district, and the neck pieces, dating from the fifteenth to the nineteenth century, are much cruder and not too similar. The closest similarities seem to lie with an artifact identified as a navel piece (*kingugdlersiut*) and a nostril piece (*upassat*) found with a peculiar kayak assemblage on Washington Land (Mathiassen, 1928, p. 203). Mathiassen assesses this mysterious find as characteristic of the specialized West Greenland kayak complex and dates it to the sixteenth or seventeenth century. The towing-gear pieces specifically "are implements which in this form are not known outside of West Greenland." It is difficult to explain these artifacts, common neither to Thule nor to the Polar Eskimo who were far to the north of the highly specialized kayak complex, particularly when no other artifacts of this complex are present.

Fish spear (leister)

TlAt-3-12, of antler (Plate IX, fig. 17), comes from beneath 6 inches of silt and midden and from under the bottom course of a buried two-course wall, F5, on the Gilman East Site. It is very crude, but undoubtedly Dorset in manufacture, although probably made with an iron-bladed knife

or adze. The side prongs are tipped with small, bluntly-bladed, medially-facing, hook-shaped barbs. The dorsal surface has been grooved for a central prong, fastened to the head through two gouged lashing slots. The central surface is crudely scarfed, and there is a gouged line hole near one edge. It is 16 cm long, 4 cm wide between the lateral edges of the side prongs, and 1.8 cm wide between the medial blades of the side prongs. It hardly seems wide enough to take the Lake Hazen char.

Fish spear side-prongs

TjAo-1-1, an antler leister side-prong (Plate IX, fig. 18), is the only artifact from Hematite Site. It has one medially-facing barb at the tip and is scarfed on the shaft edge and roughened laterally for binding. It is 17.2 cm long, and the hook-shaped barb is 1.9 cm long and 2.0 cm wide. TkAu-1-68, of antler (Plate IX, fig. 19), from the west-wall cache of Occupation 3, House 2, Ruggles Outlet Site, is unusually large. The edge next to the shaft is scarfed, with a binding groove opposite. It is 26.8 cm long, 1.9 cm wide at the binding groove, and the large, medially-bladed, hook-shaped barb is 4.9 cm long and 3.3 cm wide. TkAu-1-111, also of antler (Plate IX, fig. 20), is a broken fragment of a side prong from the cache of tools under the east sleeping platform, Occupation 3, House 2, Ruggles Outlet Site. It is carefully made (6.3 cm long), and the barb is 3.0 cm long and 2.0 cm wide.

These side prongs bear only slight resemblance to others reported from the general area. The fact that they have only one, broad, bladed barb at the tip seems to set them apart from the leisters of the Thule and Inglefield Gulf vicinities.

Salmon spear side barbs

This category includes a group of artifacts, similar in shape, which have been called "salmon spear side barbs" elsewhere in the literature. They are grouped here for comparison with published material from other sites, although some appear to have been used as small gaff hooks.

TkAp-1-2, of antler (Plate IX, fig. 23), from the surface of the Basil Norris Site seems too large and blunt for use as a spear barb. It is slightly bladed at the tip, scarfed with a step flange for fastening to the shaft, and has two binding holes. It is 10.2 cm long, 2.4 cm wide, and 1.2 cm thick. The binding holes are .63 cm in diameter. TkAu-1-61 and TkAu-1-62, both of antler (Plate IX, fig. 21), were found together and are nearly identical. They come from the Occupation 3 entryway of House 2, Ruggles Outlet Site. They are scarfed on the shaft edge, with a step flange at the base and five binding holes along the side and base. They are 6.6 and 6.3 cm long respectively, 1.7 and 1.8 cm wide, and the binding holes are .22 or .23 cm in diameter.

TkAu-1-87, of antler (Plate IX, fig. 22), from the floor, Occupation 2, House 2, Ruggles Outlet Site, differs in form but appears to be the side barb of a fish spear. It tapers to a conical point, is flattened dorsally and flanged at the butt. A lashing groove and a peg driven through a drilled hole held it to the shaft. It is 6.4 cm long, .9 cm wide, and the peg hole is .32 cm in diameter.

Scarfed-tang projectile points

Holtved and others have called this category of artifacts "salmon spear side barbs." However, the prevalence of the artifacts in middens of primarily inland animal bones, and the fact that many of the points are blunted or broken have led me to classify them as small projectile tips—arrow or dart points.

Four of these artifacts, all of antler, were found at the Lonesome Site (Plate X, fig. 1, 2). TjAq-1-52 and TjAq-1-85 are from Midden V, TjAq-1-69 from the east wall of F35, and TjAq-1-39 from the surface near F7. They are all scarfed along one edge and double-bladed at the tip, with a dorsal and ventral medial ridge. Only two are unbroken; these are 9 and 7.3 cm long respectively, and 1.1 and .8 wide.

Eight projectile tips, all of antler, come from House 2, Ruggles Outlet Site (Plate X, fig. 3 to 6). TkAu-1-83, TkAu-1-84, TkAu-1-86, and TkAu-1-88 were mixed with charred grease and animal bones, south of the small fire pit on top of the late west wall of House 2. TkAu-1-26 is from the south wall, Occupation 3, and TkAu-1-121 from the south wall, Occupation 2. TkAu-1-10 and TkAu-1-28 are from Occupation 1; the former from inside the stone locker under the eastern sleeping platform, the latter from under the lowest floor slab. All are oval to round in cross-section, tapered to round, sharp points; scarfed at the tang end and usually roughened for binding. Only two are unbroken; these are 7.2 cm and 6.5 cm long, and .8 cm wide.

Conical-tanged projectile points

TjAq-1-60, of antler (Plate X, fig. 7) from F33 on Lonesome Site, is the only conical-tipped, conical-tanged projectile point in the season's collection. It tapers at both ends, with a rather blunt point at the tip and a sharper point at the tang end, with two small asymmetrical knobs on the tang. It is 14.1 cm long, .95 cm wide, and .85 cm thick. TjAq-1-64, of bone or antler, from F31 is a fragment of a projectile point knobbed tang.

Projectile points averaging 1 cm in diameter with a conical tang and asymmetrical knobs on the tang, and ending in a double-bladed or separate blade tip, all come from House 2, Ruggles Outlet Site, in the cache of tools under the eastern sleeping platform, Occupation 3. TkAu-1-106, (Plate X, fig. 9) 23.1 cm long, 2 cm wide at its widest point, and .6 cm thick along most of the blade, is double-bladed, and thick and diamond-shaped in cross-section close to the tip for better penetration. TkAu-1-105 (Plate X, fig. 8) is double-bladed, but the blade is asymmetrical. It is 15.2 cm long, 1.5 cm wide, and .65 cm thick with a diamond-shaped cross-section near the tip. TkAu-1-102 (Plate X, fig. 12) is round in cross-section, ending in an egg-shaped knob, with a slit for a blade held in place with a peg. The two-piece shaft is joined with a stepped scarf, and there are asymmetrical knobs on the tapered tang. It is 16.3 cm long; the shaft is 1 cm in diameter; the peg hole is .33 cm in diameter, and the blade slit 1 cm long, .2 cm wide, and 1.48 cm deep. None of these conical-tanged projectile points have sharply-marked shoulders at the top of the tang.

Wooden lance socket, or stilleto handle

The finding of TkAu-1-12 (Plate X, fig. 17) in two pieces in House 2, Ruggles River, served as a check on our stratigraphic assessment of the house. Half of the artifact lay on the floor under the eastern sleeping platform, Occupation 1, the other half was found under an Occupation 1 floor slab in the entryway. At both find spots, the wood was frozen in permanent clear ice (permafrost). It is 13.2 cm long, 2.5 cm in diameter, and is carefully made and rubbed smooth. One end is squared off and drilled with a socket 1 cm in diameter and 5 cm deep. The other end tapers abruptly to a blunt point, and either fitted into a socket 1.7 cm in diameter and 1.8 cm deep, or was covered with a ferrule. Since any of the conical-tanged projectile points fit this socket, it seems likely that it formed a sort of loose foreshaft for hunting muskox with a lance. It is inevitable that muskoxen would break a rigid lance in their death throes, and with a lance of this type repeated thrusts could be made with the same shaft and reserve wooden foreshafts and antler points. However, the only comparable artifact in the published literature is Holtved's "stilleto handle" (Holtved, 1944, Plate 7, fig. 10, 11), which appears to be early in the Thule vicinity.

Fish needles

Four of these artifacts (Plate X, fig. 13-16), all of antler, are from House 2, Ruggles Outlet Site. TkAu-1-57 and TkAu-1-64 are from the Occupation 3 floor of the entryway; TkAu-1-85 is from the small midden south of the fireplace on top of the late Occupation 3 west wall, and TkAu-1-25 is from the surface of the Occupation 3, east sleeping platform. Each has a drilled hole at one end, channelled backward on both faces; two needles end in double-bladed spear points. They range in length from 6.7 cm to 7.3 cm, are .8 to 1.2 cm wide and .4 to .5 cm thick, with drilled holes .37 to .41 cm in diameter.

Toggles and trace buckles

TkAu-1-74 of narwhal ivory and TkAu-1-75 and TkAu-1-113 of walrus ivory (Plate X, fig. 18 to 20) are dog-trace buckles from House 2, Ruggles Outlet Site; the first two from the west sleeping platform, Occupation 3; the last from the west sleeping platform, Occupation 2. All are rounded to ovoid with two drilled holes in the same plane, with grooved channels running backward on both faces from the smaller hole. They range in length from 4.8 to 3.4 cm and from 2.8 to 2.3 cm wide; all are 1.5 cm thick. The lead line holes are .55, .55, and .6 cm in diameter, and the trace holes 1.2, 1.1, and 1.0 cm in diameter.

TkAu-1-116 (Plate X, fig. 21), a narwhal ivory toggle for a sledge trace line, comes from the northwest side of the Occupation 3 entryway, House 2, Ruggles Outlet Site. It is 4.2 cm long and 1.9 cm wide, flattened on the ventral face with a wide groove across the rounded dorsal face.

TjAq-1-37 (Plate X, fig. 22) is a drilled stone toggle made of a black, lightweight tuff from the surface of Midden V, Lonesome Site. It is 5.9 cm long, 2.6 cm wide, and 2 cm thick, roughly pecked and whittled to shape. The drilled hole is .55 cm in diameter.

Snow knives

TkAu-1-37, of whale bone (Plate X, fig. 11) from the Occupation 3 east sleeping platform of House 2, Ruggles Outlet Site, is the only complete example. The handle is short (6 cm) and slightly angled, but not in so pronounced a fashion as the knives from Thule and Inglefield Gulf. The handle terminates in an L-shaped flange. There is a pronounced shoulder on the under edge, and a less pronounced, doubly-bevelled shoulder on the upper edge. The blade is straight, tapering to a rounded point, and curved ventrally like the rib from which it was made. A hole, .52 cm in diameter, is drilled medially in the face of the blade near the handle. It is 37 cm long, 5.7 cm wide, .6 cm thick at the blade, and .65 cm thick at the handle. An ivory button, TkAu-138, 1.8 by 1.5 cm and 1.2 cm thick with a multi-drilled hole .4 by .6 cm (made with a drill .3 cm in diameter) lay beside the knife on the platform slab, and must have been the button at the end of the knife's suspension loop.

This house also contained three broken tips of snow knives, TkAu-1-29 and TkAu-1-33 of ivory, and TkAu-1-63 of whale bone. TkAu-1-29 comes from the south wall, Occupation 2. It was much used; there are four drilled patching holes (.25 to .27 cm in diameter). It last functioned as a chisel or scraper. TkAu-1-33 comes from the Occupation 3 debris in the floor of the south cooking alcove, and TkAu-1-63 from the Occupation 3 entryway. The whale-bone hair-combs from this house also appear to have been made from broken snow-knife tips.

Greely describes and illustrates (Greely, 1888, Plate IV, fig. 10) a peculiar composite snow-knife from this house. The short, straight bone handle is wedged into grooves on a curved bone blade (see Figure 9a).

Snow beater

TkAu-1-81, of whale bone (Plate XI, fig. 7), from the Occupation 2 entryway of House 2, Ruggles Outlet Site, is probably a snow beater, although it is bladed like a knife. The tip is squared off, the blade is straight, the handle angled slightly, terminating in an interior flange. A lanyard hole near the butt is .56 cm in diameter. It is 21.8 cm long, 3.4 cm wide, .65 cm thick at the blade, and 1.6 cm thick at the handle, which is 7 cm long.

End-bladed knives

TkAu-1-79, of antler (Plate XI, fig. 6), from the Occupation 3 entryway of House 2, Ruggles Site, is of a type which Holtved has called a "whittling knife" (Holtved, 1944, Plate 20, fig. 17 to 20). The handle is a slightly modified caribou antler tine, generally round in cross-section, squared off at both butt and blade end, with an iron blade set in a small, shallow socket. It is 11.5 cm long, 1.8 cm in diameter, with a blade 4.1 cm long which extends .7 cm into the tine handle (see Figure 7d).

TkAu-1-97, of whale bone (Plate XI, fig. 5), from the north ante-chamber, Occupation 3, House 2, Ruggles Site, is of a type Holtved calls a "flensing knife" (Holtved, 1944, Plate 20, fig. 1, 2), characterized by an end blade slit which goes from edge to edge, and by the long, symmetrically-shaped handle. This artifact is parallel-sided, rounded at both

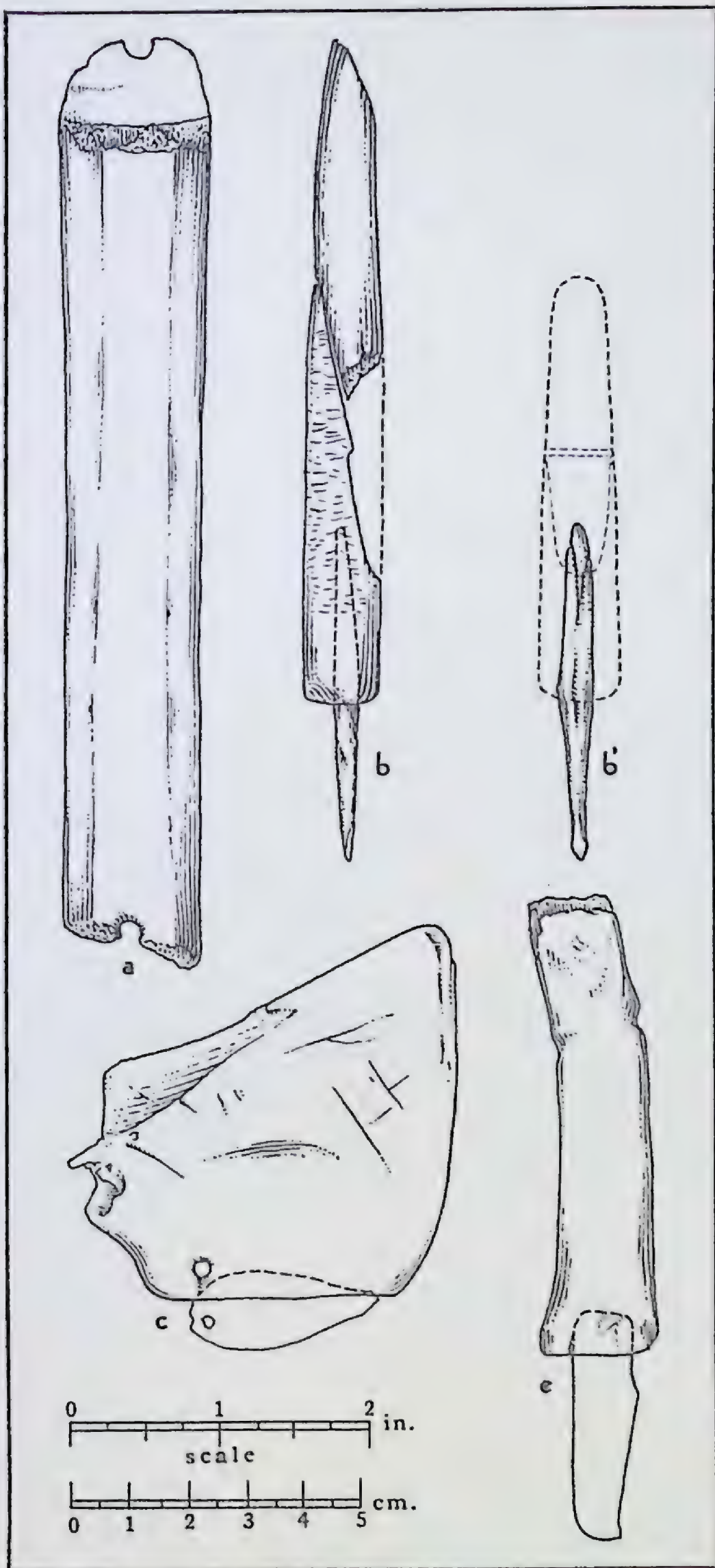


FIGURE 7. Artifacts with iron blades. *a*) Whittling knife with iron blade. *b*) Antler ulu with iron blade. *c*) Whittling knife with iron blade. *d*) Depth of iron drill determined by X-ray. *e*) Depth of iron drill determined by X-ray. *f*) Depth of iron drill determined by X-ray.

ends, bevelled along both edges of the dorsal and ventral faces, and drilled at both ends for a lanyard hole and a peg to hold the blade in place (see Figure 7a). It is 16.2 cm long, 2.2 cm wide, and 1.3 cm thick. The blade slit, 2.2 cm long, opens at both edges and is 1.8 cm deep. The drilled holes are .42 cm in diameter.

Four end-bladed antler knife handles taper inward from blade end to butt, have blade slots in the end, and are squared-off at both ends. All of these are broken or split at the butt end. TkAu-1-23 is from the Occupation 3 floor of House 2, Ruggles Site; TkAu-1-24 and TkAu-1-91 (Plate XI, fig. 4) are from the Occupation 2 floor and Occupation 2 entryway of the same house, and TjAq-1-17 is from the north wall of F2, Lonesome Site (Plate XI, fig. 3). TkAu-1-91 has a wide slot for a stone blade and a trace of a lanyard hole at the broken butt end.

TkAu-1-90 and TkAu-1-104 of antler (Plate XI, fig. 1, 2) from the Occupation 3 west sleeping platform and from under a slumped wall block over the Occupation 1 floor of House 2, Ruggles Site, both have curved handles, ending in an L-shaped flange. TkAu-1-90 has a drilled lanyard hole .43 cm in diameter, near the butt. It is 10 cm long, 2 cm wide, and 1.1 cm thick, and is apparently either unfinished or prepared for a tanged bone blade, since there is no blade slot but only a gouged-out round hole at the blade end. TkAu-1-104 has an incomplete lanyard hole partly drilled from both dorsal and ventral surfaces, and a hole started on the handle edge under the lip of the flange. It is 10.8 cm long, 1.8 cm wide, and 1.5 cm thick, with a blade slot 1 cm long, .3 cm wide, and 1.3 cm deep.

TlAt-3-5, from F4 of the Gilman East Site, appears to be the slitted tip of a harpoon head used for a small end-bladed knife. TkAu-1-72 (Plate XI, fig. 9) from underneath the Occupation 1 entryway of House 2, Ruggles Outlet Site, is a piece of heavily scored and drilled ivory, highly polished from use, and apparently half of a composite knife handle.

Ulus

Two specimens were found, both in House 2, Ruggles Outlet Site. TkAu-1-80 from Occupation 3, beneath the east sleeping platform, is a crude, only slightly modified caribou antler, broad at the back, and thinned slightly above the blade for the fingers, with a small iron blade held in place with lashing holes (Plate XI, fig. 10). It is 7 cm long, 7.3 cm wide, 1.4 cm thick at the back, .8 cm thick at the finger grooves, and 1.2 cm thick at the blade socket. The iron blade is 3.2 cm long, .15 cm thick, and 1.85 cm wide, extending .85 cm into the socket (see Figure 7c). TkAu-1-17 (Plate XI, fig. 8) from under the Occupation 1 east sleeping platform, of whale bone, is narrow, parallel-sided and curved, rounded at both ends and drilled at one end. The split handle is 10.7 cm long, 2.3 cm wide, and was approximately 3 cm thick. The blade extended into the socket 1.4 cm, and the suspension hole is .65 cm in diameter.

Composite knives

The Gilman East Site produced two partially complete specimens of this type. TlAt-3-9 (Plate XI, fig. 11) is part of a whale-bone composite knife handle from a surface depth of 5.5 inches in F5, only a few inches

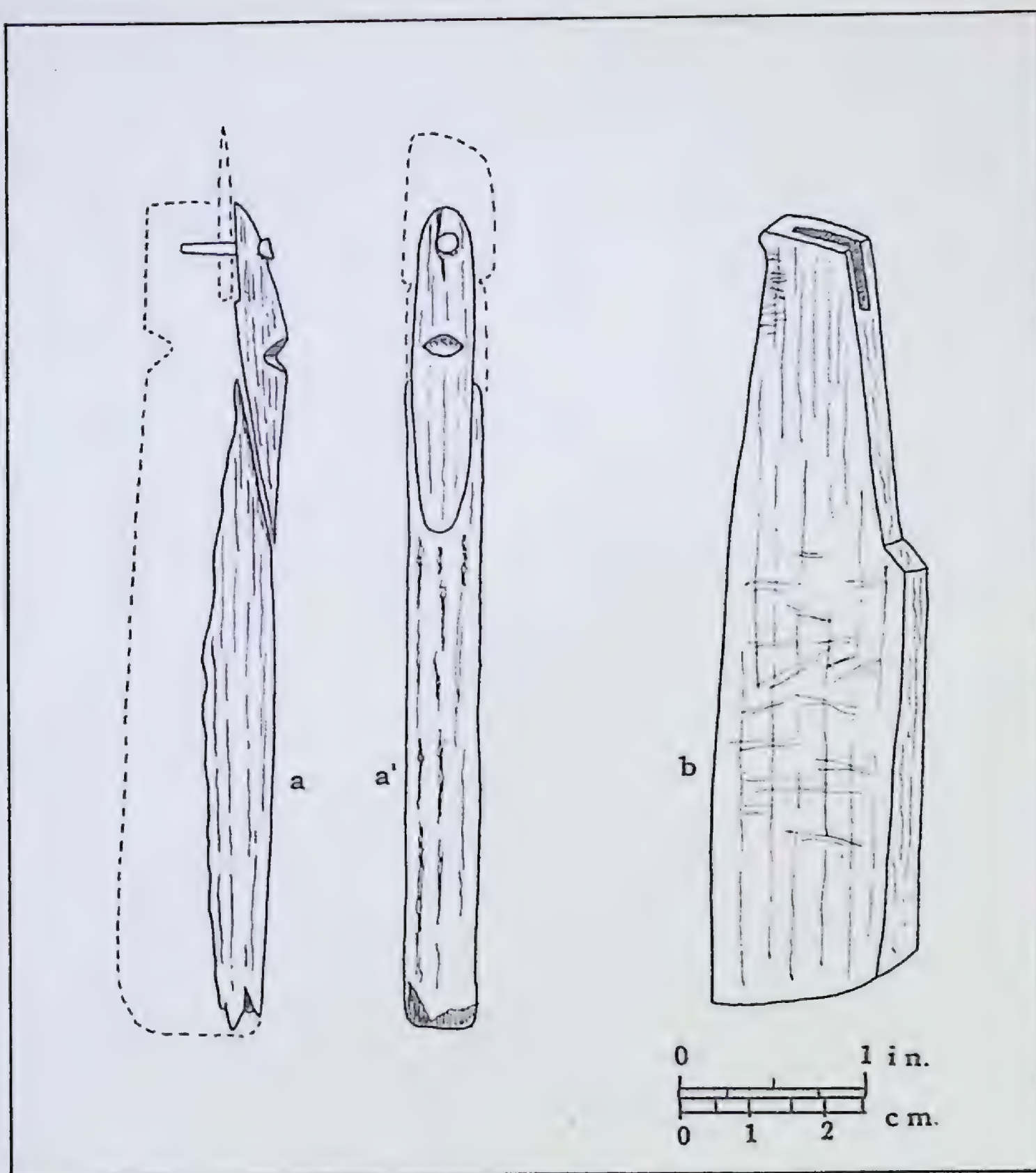


FIGURE 8. Whale bone composite knife handles, Site TlAt-3. *a*) Reconstruction of knife handle from Feature 6. *b*) Partial handle from Feature 5.

away from the Dorset fish spear (TlAt-3-12). It is parallel-sided, rectangular in cross-section, with squared ends. It is step-scarfed at the blade end and roughened on the opposite edge for binding the supporting piece to the main handle. The small blade-slot in the end continues down the face of the step scarf. It is 11 cm long, 2.5 cm wide, and 1.5 cm thick. The blade slot is .85 cm long (total reconstructed length 1.8 cm), .19 cm wide, and 1.1 cm deep.

TlAt-3-1 and TlAt-3-2 (Plate XI, fig. 12, 13), both of whale bone and from near the entrance of F6, appear to be parts of the same artifact. The former is a split, scarfed piece 9.5 cm long, 1.4 cm wide, and .8 cm thick.

This seems to be part of the handle; TlAt-3-2, a small piece with a peg in a drilled peg hole, with a lashing groove across the back, appears to be the supporting piece (see Figure 8a). From the relationship of the peg to the smoothed and worn area next to the blade, the peg probably passed through the blade. Support pieces like this are common from Dorset assemblages, but they are usually not of whale bone. The pegged support piece is said to be unique to the Unguliwigamiut Site of Nunivak Island, Alaska (Van Stone, 1957, Plate 3, fig. 18).

Bow braces

TjAq-1-70, of antler (Plate XI, fig. 15), is flat and comes from the south sleeping platform of F35, Lonesome Site. TkAu-1-93 (Plate XI, fig. 14) also of antler, but sharply angled, is from the Occupation 3 entryway of House 2, Ruggles Outlet Site.

Bow sinew twister

TkAu-1-119 (Plate XI, fig. 22), very well made of walrus ivory and highly polished, is from the north antechamber, Occupation 3, House 2, Ruggles Outlet Site. It is 11.5 cm long, 1.1 cm wide, and 6.5 cm thick at the centre, which is drilled for suspension with a hole .35 cm in diameter. The ends curve upward dorsally and downward ventrally.

Drills

TkAu-1-101, TkAu-1-107a, and TkAu-1-107b (Plate XI, fig. 20, 21) are all from the tool cache under the east sleeping platform, Occupation 3, House 2, Ruggles Outlet Site. TkAu-1-101, of antler, is parallel-sided to slightly tapered toward the point, and step-scarfed and roughened for attachment to a wooden shaft at the other end. The drill point is a hand-forged iron pin, 6 cm long, of which 3.2 cm are inside the socket (see Figure 7b), .5 cm wide at the socket, and .3 cm wide at the slightly splayed cutting edge of the drill. The antler foreshaft is 11.5 cm long and 1.35 cm in diameter. TkAu-1-107a and b are both of wood and are nearly identical. They both taper to a blunt point and are scarfed at the other end, although both are broken above the point where a step scarf would begin. They are 6 cm long and 1.3 cm in diameter, and since they both fit the antler foreshaft, they are apparently spares for the same drill. TjAq-1-75a, from the southwestern cooking alcove of F33, Lonesome Site (Plate XIII, fig. 9) is an iron drill point broken off and embedded in an antler edge-mounting. It is 1.5 cm long and, like the Ruggles drill, splays out to a flat, diamond-shaped, cutting head .26 cm wide.

Drill sockets

TkAu-1-94 from the Occupation 3 entryway of House 2, Ruggles Outlet Site (Plate XI, fig. 19), is a caribou astragalus drill socket, smoothed on both sides, with grooves for the teeth and a 1.1 cm hole in the centre. TkAu-1-103 is a muskox astragalus from the tool cache under the eastern sleeping platform of the same house. It is not modified in any way, but its presence in the cache suggests that the owner of the tools planned to use

it as a socket piece. TkAu-1-9, of ivory (Plate XI, fig. 18), found frozen in the permafrost of the Occupation 1 floor, under the northeastern stone locker of the same house, has a peculiar hour-glass shape, with sockets at both ends and tooth grooves in the centre. It is oval in cross-section, 2.3 cm long, 2.3 cm wide, and 1.8 cm thick. Both socket holes taper from 1 cm in diameter to .3 cm.

Wooden fire drills

TkAu-1-14 (Plate XI, fig. 16) from behind the Occupation 1 north wall, House 2, Ruggles Outlet, is 9.4 cm long, 2 cm in diameter, and is charred at one end. TkAu-1-34 (Plate XI, fig. 17) was frozen in the floor of the Occupation 1 northeastern stone locker of the same house. It is 7.3 cm long, 1.6 cm in diameter, and has a narrow groove around the middle. Neither end is charred.

Wooden fire drill hearths

TkAu-1-13 (Plate XI, fig. 23) and TkAu-1-109 both come from House 2, Ruggles Outlet Site. The former comes from behind the south wall of Occupation 2, the latter from the cache of tools under the eastern sleeping platform, Occupation 3.

Pyrites

One very small crystal, TjAq-1-78, was found in the tent ring F35 of the Lonesome Site.

Antler hooks

TkAu-1-44 (Plate XII, fig. 1) from the tent ring F1, Ruggles Outlet Site, is a large, well-made antler hook, resembling a large fishhook, with a gouged or drilled hole near the end, and grooves on both faces running from the hole to the rounded end. The shank is 10 cm long and is 6.5 cm wide at the hook. Presumably it is a pot hook, or was tied to the tent poles and used for suspending articles from the tent roof. TkAu-1-65 (Plate XII, fig. 2) from Occupation 1, under the west sleeping platform support, House 2, Ruggles Outlet Site, is a sharpened hook, scarfed at the opposite end, and is 21 cm long. It appears to be either a gaff hook, or a hook for extracting meat from the narrow opening at the top of a meat cache.

Meat sticks

The three specimens of this type all come from House 2, Ruggles Outlet Site. TkAu-1-7, from the Occupation 3 east sleeping platform, and TkAu-1-92, from the Occupation 2 kitchen floor (Plate XII, fig. 4, 5), are both carved ribs, probably of muskox. The former is 18.5 cm long and 1 cm wide; the latter is 26 cm long, 1.5 cm wide, and both are polished and saturated with grease. TkAu-1-49, from the Occupation 3 entryway, is an antler of a female caribou (Plate XII, fig. 3).

Pail handle (?)

TkAu-1-8, of antler (Plate XII, fig. 6), comes from the Occupation 3 east sleeping platform, House 2, Ruggles Outlet Site. It is fully carved, flat, parallel-sided with rounded ends, and grooved at both ends. It has the appearance of a small bow for a drill, or fire drill that has warped flat by earth pressure. It is 22.2 cm long, 1 cm wide, and .55 cm thick.

Bone tubes

TkAu-1-40, made of narwhal tusk (Plate XII, fig. 7), was found on the outer margin of the south wall of House 2, Ruggles Site, just under the sod. It is round in cross-section, with a slight taper toward the mouth end. There is a slight flange at the mouth end, chipped in places and made smooth by rubbing. The artifact was apparently used for a long time, since it is rubbed to a high polish. It is 25 cm long, 1.7 cm in diameter, and tapers to 1.6 cm at the mouth end. The reamed hole is .85 cm in diameter at the mouth end, and 1 cm in diameter at the opposite end.

TjAq-1-68 (Plate XII, fig. 8), from the east wall of F35, Lonesome Site, is a tube made of a cut goose ulna.

Needle cases

TkAu-1-2 (Plate XII, fig. 10) from the north wall, Occupation 3, House 2, Ruggles Outlet Site, is a particularly well-made winged needle case of walrus ivory. Two parallel, spurred lines border the edges, and two parallel lines border the wider end on the dorsal surface. The needle case was in use for many years, possibly generations, since it is highly polished and saturated with grease. Rows of little teeth marks suggest its secondary use as a baby pacifier. It is 9.4 cm long, 3.2 cm wide at the wider end, and 1.5 cm wide at the narrower end. The central hole is 8 cm in diameter.

TkAu-1-122 (Plate XII, fig. 11), from the Occupation 3 north antechamber of the same house, is tubular, expanded at the middle, and appears to be a needle case, possibly unfinished, of a general winged type. It is made of a black substance which may be charred antler.

Thimble-holder

TkAu-1-3 (Plate XII, fig. 9), of ivory, lay in position above the wider end of the ivory needle case. It is anchor-shaped, with a small, gouged suspension hole at the top, with narrow grooves running from the hole to the top of the anchor. It is 4 cm long, 2 cm wide at the widest point, and .4 cm thick. The top suspension hole is .15 by 1 cm, the bottom holes are each 3.5 cm in diameter.

Wooden dolls

TjAq-1-42 and TjAq-1-80 (Plate XII, fig. 12, 13) both come from the Lonesome Site, the former from the surface outside the north wall of F33, the latter from the sleeping platform of F31. TjAq-1-42 is long (10 cm) and narrow, with a parallel-sided torso, arms merely indicated, and

legs tapering to points with no indication of trousers or boots. The navel is indicated, and there is a slight rounded bump in the pubic region. It appears to be a male representation. TjAq-1-80 is smaller (6.2 cm) with torso widening at the waist, arms indicated, a slotted triangle in the pubic region, a suggestion of boots and feet, and a topknot on the head. It is definitely a female representation.

Ajagaq

TjAq-1-59 (Plate XIII, fig. 1), from F33, Lonesome Site, is made of a bearded seal radius, with a large drilled hole in the articulating surface of the proximal end, two gouged connecting holes near the medial margin of the distal end, and a small suspension hole in the middle of the lateral margin. It is 14.5 cm long; the hole in the proximal joint surface is .88 cm in diameter, and the suspension hole is .44 cm in diameter. TjAq-1-73, from the west wall of the same tent ring (Plate XIII, fig. 2), is apparently the ajagaq pin. It is part of the right pelvis of a small cetacean, 14.8 cm long and whittled at the proximal end.

Bone combs

Three whale-bone specimens were found, all in House 2, Ruggles Outlet Site, and all dating from Occupation 3. TkAu-1-4 (Plate XIII, fig. 4), from its find-spot on the east sleeping platform near the human bones, was probably in the woman's hair when she died. It is more weathered than the others and somewhat cruder, with one of the four original teeth broken off. The handle is T-shaped and, like the others, of what Mathiassen calls a generalized "human" form. It is 7.5 cm long, 2.2 cm wide, and .4 cm thick.

TkAu-1-118 (Plate XIII, fig. 3) probably made from the tip of a snow knife, comes from the north margin of the open fireplace on the new west wall. The handle is laterally constricted, and there are six teeth. It is 7.3 cm long, 2.9 cm wide, and .4 cm thick.

TkAu-1-76 (Plate XIII, fig. 5) lay on the west sleeping platform. It is also laterally constricted with a drilled hole .28 cm in diameter at one end and with seven teeth. It is 9.3 cm long, 3.1 cm wide, and .45 cm thick.

Bead, ivory

TkAu-1-57 (Plate XIII, fig. 11) was found with a group of amber beads on the floor of F31, Lonesome Site. It is cylindrical—.75 cm in diameter, .46 cm thick, with a hole .25 cm in diameter.

Beads, amber

The use of amber is far from a characteristic prehistoric Eskimo trait. Holtved reports one amber bead from Thule House 26 and one amber bead from Nugdlit (Holtved, 1954, page 90), and Taylor (pers. comm.) states that one was found in the Thule material at Resolute Bay, Cornwallis Island. But in the vicinity of Lake Hazen there is a large supply of amber fragments, and apparently the Eskimos used amber extensively, at least through one prehistoric period. The very friable amber occurs in small pitch-pockets in the woody coal exposed on the northeast shore of Lake Hazen.

As the coal erodes into the lake, the tougher amber nodules are sorted out and washed to the sandy beach at the east end of the lake. It is interesting to note that the prehistoric users selected only the clear "gem" stones that constitute approximately one per cent of the amber supply and are smaller than the "crackled," pitchy nodules. There is a rumour which we have not been able to trace, that Peary's Eskimos told him of the amber at the lake. In this regard it is significant that two of their houses lay near the eastern beach, and there were several amber fragments on the floor of the 1906 south house.

A total of 74 beads (including eight fragmentary beads) were found during the season. They are roughly round to oval, chipped and ground to shape. Only the five from House 2, Ruggles Outlet Site, are polished. The average bead is .5 cm long, 1 cm in diameter, and is pierced with a hole .15 cm in diameter. They range in size from a nodule 1.5 cm long, 1.4 cm wide with a .22 hole, to a bead .38 cm long, .63 cm wide, pierced with a hole 0.06 cm in diameter.

TjAq-1-57 (Plate XIII, fig. 11) is a group of 36 beads from the sleeping platform, floor, and entryway of F31, Lonesome Site. TjAq-1-67 (Plate XIII, fig. 12) is a group of 14 beads from the north part of the floor of F35, Lonesome Site, and TjAq-1-71 is a bead from F33. TkAu-1-30 (Plate XIII, fig. 13) is a group of five polished beads, found together in a small pocket under a crack in the Occupation 3 sleeping platform of House 2, Ruggles Outlet Site. TkAu-1-100 is a fragment of bead from behind the south Occupation 2 wall of the same house.

Unworked amber fragments

These occurred in some quantity in all the houses that produced beads, and in F1, Lonesome Site, as well. The most significant collection is a group of over one hundred fragments scattered on the Occupation 3 entryway floor of House 2, Ruggles Outlet Site. The greatest quantity was localized near the house entrance; they appear to have come from a disintegrated bag. Many of these fragments are too small for beads.

Tooth pendants

TjAq-1-24 and 25 (Plate XIII, fig. 14), drilled seal canines, were found on the floor of the small winter house, F11, Lonesome Site, and are the only artifacts from the house. TjAq-1-63, a drilled fox canine, comes from the sleeping platform of F31 where the greatest number of amber beads was found.

Collected animal teeth

Five caribou lower incisors (TjAq-1-65) lay grouped on the sleeping platform of F31, Lonesome Site. The prevalence of beads from this house (42 whole and fragmentary amber beads, one ivory bead, and a drilled fox canine) suggests that these were collected for conversion to pendants. Three unmodified polar bear canines—TkAp-1-5 from the surface of the Basil Norris Site, TjAr-1-1 from the surface of the Tent Ring Site, and

TkAu-1-82 from the Occupation 1 floor of House 2, Ruggles Outlet site—may have been charms. Another charm may be the bladder-nosed seal canine (TkAu-1-53) from the Occupation 3 entryway of the Ruggles house.

Ivory pendant

A broken ivory pendant (?), TkAu-1-47 (Plate XIII, fig. 15), 3.7 cm long, comes from the floor of the tent ring, F1, of the Ruggles Outlet Site.

Buttons

TjAq-1-53 (Plate XIII, fig. 8) made of split polar bear canine, is a fragment 2.7 cm long, 1.5 cm wide, with a hole 1.1 cm in diameter at one end. It comes from Midden V of Lonesome Site and might be a broken tension piece for a harpoon line. TjAq-1-46, from the entryway of F33, Lonesome Site (Plate XIII, fig. 7), is made of bone. It is 3 cm long, and originally had a long, round-ended slot in the middle.

Bone and antler edge mountings

TjAq-1-74 and 75 (Plate XIII, fig. 9, 10) of antler, from the east wall and the southwest cooking alcove of F33, Lonesome Site, have nine and five holes respectively. The holes range from .2 to .26 cm, and the broken iron drill point in TjAq-1-75 is .26 cm in diameter. TkAu-1-32 (Plate XIII, fig. 18), an antler piece from the floor of the Occupation 1 locker, and TkAu-1-110 (Plate XIII, fig. 6) of bone, from the tool cache under the Occupation 3 east sleeping platform, House 2, Ruggles Outlet Site, both appear to be edge mountings. The holes in the former are .38 cm in diameter; in the latter they are .296 cm in diameter.

Three other specimens of drilled bone appear to be mountings of some sort. These are, TlAt-3-4, whale bone, from F4, Gilman East Site; TjAq-1-45, from the surface outside of the south wall of F33, Lonesome Site; and TjAq-1-44 from the same find-spot.

Snow probes

TjAq-1-72 (Plate XIV, fig. 1) is a carved whale-bone shaft 35 cm long and 1.2 cm in diameter, with a step-scarfed end, squared off for insertion into a small, rectangular, antler handle at the other end. It comes from the floor of F33, Lonesome Site, and is undoubtedly part of a long-shafted snow or seal-hole probe. TkAu-1-35, a carved whale-bone shaft 57.5 cm long, from the north antechamber, Occupation 3, House 2, Ruggles Outlet Site, and a highly polished fragment of whale-bone shaft 16.8 cm long and 1.4 cm in diameter (Plate XIV, fig. 2) from the same location, are also probably probes. The former tapers at one end; it has been prepared for a ferrule, socket, or handle.

Other shaft fragments

TlAt-3-10 of whittled antler, 9 cm long and 1 cm in diameter, broken at both ends, comes from a surface depth of 3 inches in F5, Gilman East Site. TkAu-1-96 (Plate XIV, fig. 3), also of antler, is grease-soaked and may be a broken meat fork.

Cut birch bark

A rectangular piece of birch bark (TjAq-1-61), cut on the four edges, 6 cm long and 2.8 cm wide, was found on the floor of F35, Lonesome Site (Plate XIII, fig. 20).

Two-handed scrapers

TkAu-1-66 (Plate XIV, fig. 9), a piece of whittled antler 17.3 cm long with a chisel end saturated with grease, and TkAu-1-36, a chisel-ended muskox tibia, both appear to be hide scrapers. The former comes from the tool cache under the Occupation 3, east sleeping platform, and the latter from the south wall, Occupation 3, House 2, Ruggles Outlet Site.

Hammer

TkAu-1-54 (Plate XIV, fig. 10), a large piece of antler tine, appears to be a hafted hammer or pounder. The tine stump is rounded off through use; the ventral surface is roughened with deep adze marks, and the dorsal surface has been smoothed to a plane surface.

TkAu-1-95, a split muskox vertebra from the Occupation 1 northeast locker floor, may have had a similar function.

Shovel (?)

TkAu-1-6, a caribou scapula and a muskox scapula, lying crossed on the floor of the locker, House 2, Ruggles Outlet Site, may have been used as shovels for scooping loose gravel from the floor of the house.

Sled shoes

Five pieces of whale-bone sled-shoes were found during the season. The most complete one is TkAu-1-39 (Plate XIV, fig. 6) from the west sleeping platform, House 2, Ruggles Outlet Site. This is a bow piece, 39 cm long, 5.3 cm wide, and 1.4 cm thick, with a lashing groove near the toe and with both peg holes and countersunk lashing holes. The shoe fits the bow of the wooden sled runner from the Occupation 3 entryway—TkAu-1-25. Seven of the drilled holes are .75 cm in diameter, and 17 holes range from .41 cm to .53 cm. TkAu-1-71 (Plate XIV, fig. 8) is a small fragment of whale-bone sled-shoe from the Occupation 3 south wall of the same house. The three broken fragments of whale bone sled-shoes from Lonesome Site have only peg holes: TjAq-1-82 (Plate XIV, fig. 4) comes from Midden V; TjAq-1-20 (Plate XIV, fig. 5) from under the north wall of F2, and TjAq-1-36 (Plate XIV, fig. 7) from the general surface of the site near the shoreline.

Pegs or nails

Eight bone, antler, or ivory pegs were found during the season. TjAq-1-15 (Plate XIII, fig. 22) from the surface of the Lonesome Site is a sled-shoe nail, as are probably the rectangular antler nails from House 2, Ruggles Outlet Site, TkAu-1-117 and TkAu-1-120.

Wooden sledge runner

TkAu-1-125, a single wooden plank 155 cm long, 5 cm thick, broken at the rear end where it is 18.6 cm wide, and tapering top and bottom to the bow 11.3 cm wide, lay longitudinally along the Occupation 3 entryway of House 2, Ruggles Outlet Site. The top is notched and drilled for cross-slats that begin 20 cm behind the bow and are spaced about 17 cm apart. The bottom edge is drilled for both lashing and pegging. Greely, in 1882, found a pair of runners in poor condition, and one runner and an antler upstander in this same house (Greely, 1886, Vol. I, p. 383). This is undoubtedly the other runner since the bone sled-shoe bow piece (TkAu-1-39) from the west sleeping platform fits it. Unfortunately, the runner that Greely put on a hill overlooking the site, because it was too heavy to carry back to Fort Conger, is no longer there.

Apparently the runner was serving, temporarily at least, as a roof beam for the entryway. It is a large and remarkably even plank to have been made with small tools from driftwood, and we suspect that it came by trade from the Norse.

Antler and whale-bone cross-slats

TkAu-1-78, from the west sleeping platform, Occupation 3, and TkAu-1-115 from behind the Occupation 1 wall, southwest side, House 2, Ruggles Outlet Site, are heavy pieces of whale bone, rectangular in cross-section, notched near one end and broken on the other. They are apparently sled cross-slats, as is a notched fragment of antler, TkAu-1-16, from the Occupation 2 kitchen floor of the same house. Some of the wooden pieces running across the entryway were also probably sled cross-slats.

Antler tine harpoon rest (?)

A small cut fork of an antler, scarfed from both faces to a thin wedge-shaped edge, TjAq-1-47 (Plate XV, fig. 4) from outside the wall of F33, Lonesome Site, has the appearance of a harpoon rest for a umiak or kayak. However, it seems doubtful that Eskimos could get a umiak through the ice-filled waters of Kennedy Channel even in the middle of summer, and the usefulness of a kayak in such conditions is questioned.

Bone wedge

TkAp-1-3, from the surface of the Basil Norris Site is a small, crude wedge, scarfed from both sides, 7.3 cm long and 2.3 cm wide (Plate XV, fig. 3).

Antler side scrapers

Cut brow tines (TlAu-3-2, TkAu-1-5, and TjAq-1-34) from the Boat Haul Site, the Ruggles Outlet Site, and the Lonesome Site, respectively, are probably side scrapers for dressing skins (Plate XV, fig. 6, 8).

Narwhal tusk ice-hunting harpoon shaft

TkAu-1-77, a fragment of narwhal tusk 50 cm long, broken at both ends, comes from the end of the Occupation 3 entryway, House 2, Ruggles Outlet Site. There is a four-sided bulge near the centre of the shaft with a small line hole running longitudinally through the most prominent bulge. Greely found a similar narwhal shaft, undrilled, in the same house, and fragments of three other narwhal tusk harpoon shafts on Cape Baird.

Wooden harpoon shaft

TlAt-2-1, the fore end of a harpoon shaft, scarfed, with four peg holes on the scarf face, lay with other drifted material on a gravel beach halfway between the Gilman East Site and the east end of the lake. Some of the wooden shaft fragments in House 2, Ruggles Outlet Site, may also be parts of harpoon shafts.

Wooden pail rim

TkAu-1-11 (Plate XV, fig. 5), frozen in the clear ice of the Occupation 1 floor, House 2, Ruggles Outlet Site, is apparently the wooden rim of a skin vessel or a drum. Its reconstructed diameter is 18 cm; it is 2.7 cm wide and has rows of small pegs around its top and bottom edges.

Wooden bowl or meat tray

TkAu-1-127 (Plate XV, fig. 1) was found wedged (presumably by wave-action) in a crevice between two rocks in the entryway of House 3, Ruggles Outlet Site, although it probably belongs to Occupation 3 of House 2. It was warped and badly broken but apparently was originally boat-shaped and was about 26 cm long and 15 cm wide. A large piece of the bottom had been spliced and mended.

Soapstone lamps, bowls, and fragments

Three complete, or restorable, vessels were found during the season. TjAq-2-1, a complete lamp, broken and patched at one end (Plate XVI, fig. 1) lay unassociated with other cultural features on the gravel shingle of a point 1.5 miles east of Lonesome Site. It is deep and narrow, with straight sides, rounded ends, and a continuous, very narrow wick ledge along one end. Its interior depth is 6 cm; the walls are 1.1 cm thick; it is 22.5 cm long and 13.7 cm wide. TlAs-3-1 also has no direct association with other cultural features. It is an oval bowl, about 25 cm long, with a heavy, wide interior lip, transverse suspension holes through the lip, and rectangular, gouged, patching holes along the cracked bottom. It was found isolated on top of a ridge overlooking the head of Black Rock Vale, a completely improbable camping or sledging spot. The ridge is, however, on the direct line of march that members of the Greely party took in returning to Fort Conger after excavating in House 2, Ruggles Outlet Site. By their own accounts, each tired man was carrying many

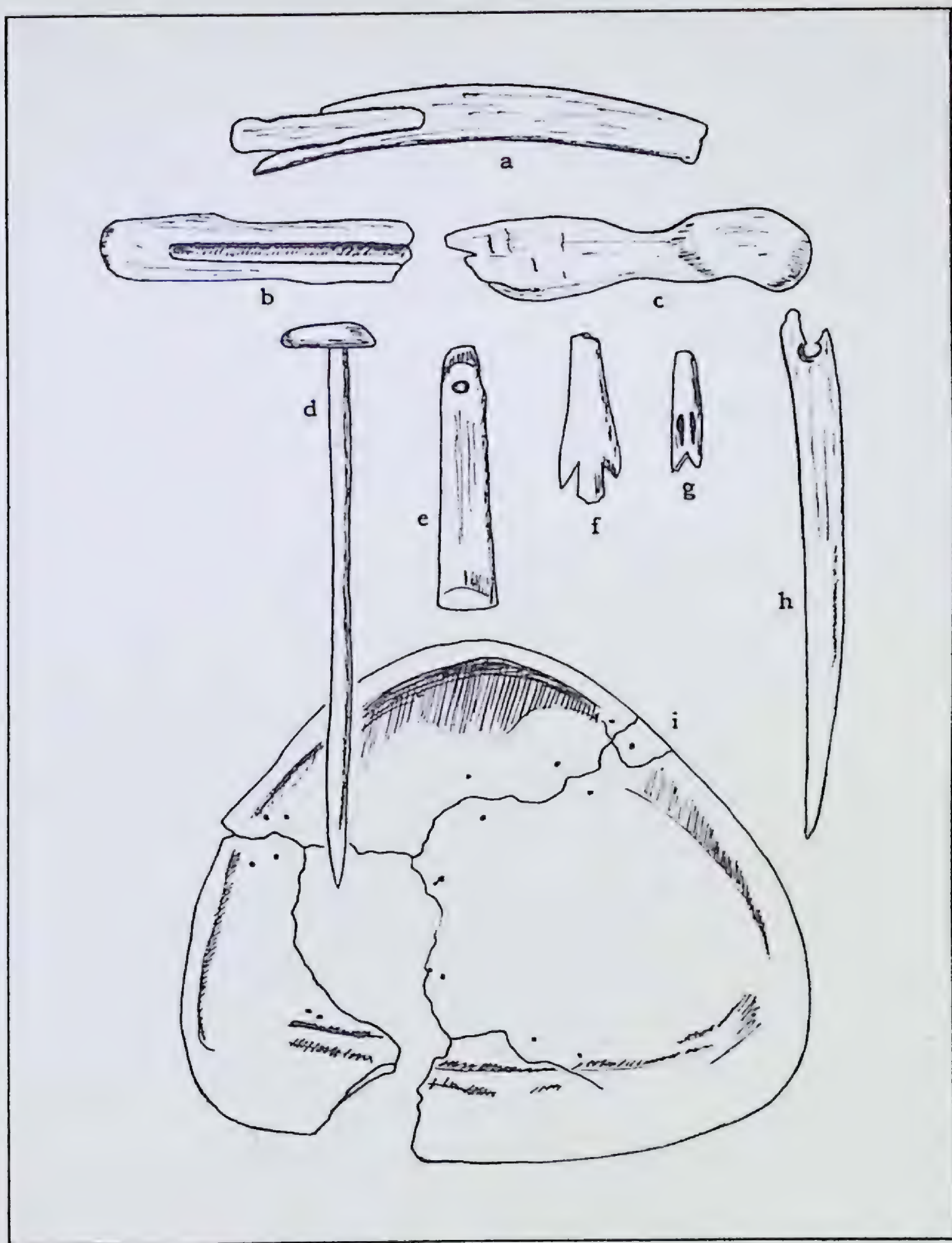


FIGURE 9. Artifacts found on the Greely Expedition (After Greely, 1888, Plates 1 to V).
 a) Composite bone snow knife. Bone handle wedged into groove in blade, House 2, Site TkAu-1, Ruggles Outlet.
 b) Grooved bone throwing board (?), Ruggles Outlet.
 c) Wooden sling handle, Ruggles Outlet.
 d) Whale-bone and antler snow probe, Cape Baird.
 e) Spatulate-ended harpoon foreshaft, Site TkAp-1, Basil Norris Bay.
 f) Fragment of Thule Type 2 harpoon head, Site TkAp-1, Basil Norris Bay.
 g) Dorset closed-socket harpoon head, Site TkAp-1, Basil Norris Bay.
 h) Ivory marline spike, or harpoon foreshaft, Site TkAp-1, Basil Norris Bay.
 i) Soapstone lamp, Cape Baird.

pounds of Eskimo artifacts, and it does not seem improbable that the heavy lamp, carried for 25 miles, was finally left on a high spot for a possible later recovery. The only large bowl fragment (TkAu-1-126) found in the house in the 1958 season was the bottom of a flat, roughly triangular, deep bowl or lamp, which lay with other stored material on the west sleeping platform.

TkAu-1-52 is a small rectangular bowl whose fragments lay in both the entryway and the north alcove, Occupation 3, House 2, Ruggles Outlet Site (Plate XVI, fig. 3). It is 7.5 cm deep, 18.3 cm long, and 11.3 cm wide. The suspension holes are on the inside of the rim at the four rounded corners, and pass vertically through very small projections. The bowl had been broken and patched at least twice. A large, very deep lamp fragment with a wick lug 3.2 cm wide, lay on the surface outside the house. The straight, deep side is at least 14 cm deep; the vessel wall is 1.9 cm thick, and the lug is 6 cm below the lip. Carved soapstone lamp patches (TkAu-1-21 and TkAu-1-60), almost identical in size and shape, were found in the Occupation 1 stone locker and the Occupation 3 entryway respectively.

Several fragments, including a wide wick ledge, were found on the surface of the Basil Norris Site (TkAp-1-4), and thin-walled soapstone fragments (TjAq-1-13, 14, and 23) were found on the surface of the Lonesome Site (Plate XVI, fig. 4).

Quartz crystals

A number of large, well-shaped quartz crystals weathered out of the local rock at the Lonesome Site. They would make excellent gravers and small knives, but none seemed to be artificially modified. TjAq-1-1, 2, and 3 (Plate XV, fig. 14, 15) show some signs of wear at the crystal apex.

Flint or chert artifacts

TlAt-1-1 (Plate XV, fig. 12) was the only definite chert artifact found during the season. It is a very small end scraper (1.8 cm wide, 1.4 cm long) with a steep, fine-flake retouch from the large-rock, deep, round house on the Gilman West Site. The material is not like any of the chert deposits found in the general vicinity, but resembles very closely the pebble chert of Polaris Promontory on the Greenland coast. TjAq-1-4, from F1, Lonesome Site, is a sharp-pointed chert flake with a very fine retouch (observable under magnification) along one side of the point (Plate XV, fig. 11). TlAt-1-1 is a small local chert flake from a surface depth of 4 inches in F5, Gilman East Site. There is an apparent slight retouch along one side. The latter two specimens may or may not be artifacts.

Unidentified objects

TkAu-1-98 (Plate XV, fig. 10) from floor 1, House 2, Ruggles Outlet Site, is a curved, double-tapered, spatulate-ended sliver of ivory. It appears unfinished, yet has a high use-polish. It may be a marline spike for working the sinews on a bow. TkAu-1-27, an ivory object from floor

2 of the same house (Plate XV, fig. 13), is complete, but its use is problematical. It is flat on one surface, carved on the other. TjAq-1-62 (Plate XV, fig. 9) from F 33, Lonesome Site, appears to be a wooden bridge for a lashing (possibly of a bow?). Two grooves have been burned in one end; the base is flat and the top rounded.

CULTURAL INTERPRETATIONS

AFFILIATIONS AND ORIGIN OF THE LAKE HAZEN ESKIMOS

One of the most significant aspects of the prehistoric Eskimo remains in the general Lake Hazen vicinity is the apparent seasonal use of the area. In the 416 linear miles of lake- and sea-coast we found more than one hundred tent rings and small semi-subterranean structures for summer or autumn use, but only four structures that could be considered winter houses (F12, Site TjAq-1; F3, Site TlAt-1; F2 and the unexcavated F3 Site, TkAu-1). Greely found at least two dozen additional rings, but only three more winter houses, the three on the east bank of Ruggles River Outlet, now washed away by the river. With this evidence we cannot speak of an Eskimo settlement in northeast Ellesmere but must consider at least the Thule and post-Thule people as seasonal migrants to the area.

So little Dorset material was found that it is impossible to generalize on the earlier period. But the bulk of the artifacts, belonging to the general Thule stage of development, lack the flavour of central Thule, that we would expect if these were colonists migrating northward through the middle of the archipelago. On the other hand, with few exceptions, each artifactual and architectural detail can be matched with material from the well-established settlements of Inglefield Land and Thule (a more detailed comparison appears in "Chronological Assessment"). This does not, of course, mean that the Lake Hazen Eskimos maintained permanent residence on the northwest coast of Greenland. It does indicate the probability that the Lake Hazen people came under the cultural sphere of the unique developments in northwestern Greenland which constitutes a continuum, possibly through Dorset or earlier, certainly from early Thule through Inugsuk to contemporary Polar Eskimo.

Many tent rings have been reported from the west coast of Ellesmere (Sverdrup, 1918; Tener; Thorsteinsson and Tozer, 1957), but no winter houses or artifacts. The only interpretable item, a Thule-type grave from Vesle Fiord (Thorsteinsson and Tozer, 1957, p. 15), is more characteristic of the central area than of northwest Greenland. This leaves the general vicinity of Alexander Fiord and the Bache Peninsula, half-way down the east coast of the island, as the nearest reported settlement of winter houses Radmore Harbour (Nares), Haa Island (Humphreys, 1936), "Eskimopolis" (Simmons, 1905), and "Turnstone Beach" (Lethbridge, 1939)]. The artifacts recovered from this vicinity shed little light on the problem. Lethbridge (1939) found a good sample on "Turnstone Beach" (which he feels certain is the "Eskimopolis" Site) including Dorset culture, Thule culture, and Inugsuk culture artifacts. But the assemblage does not appear to be closely related to the Lake Hazen cultural material. It is

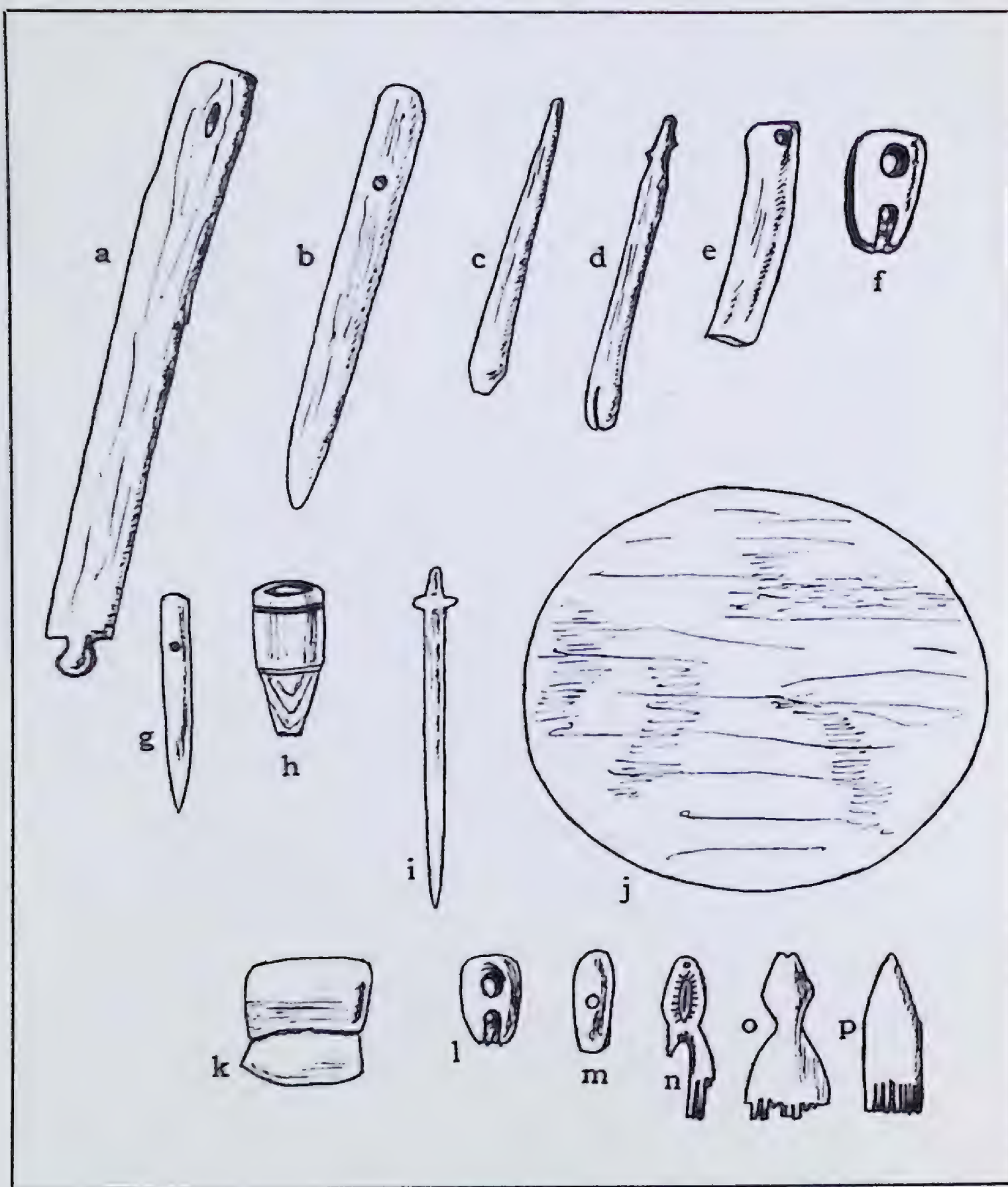


FIGURE 10. Artifacts found on the Greely Expedition (After Greely, 1888, Plates I to V).

- a) Bone bow for drill, Lady Franklin Bay.
- b) Bone harpoon foreshaft, vicinity of Fort Conger, Discovery Harbour.
- c) Bone drill shaft, vicinity of Fort Conger, Discovery Harbour.
- d) Bone projectile point with knobbed tang, and blade slit, Discovery Harbour.
- e) Knife handle, Proteus Point, Discovery Harbour.
- f) Dog toggle, Proteus Point, Discovery Harbour.
- g) Marline spike or harpoon foreshaft, Ruggles Outlet.
- h) Wooden stilleto handle, or lance socket, vicinity of Fort Conger, Discovery Harbour.
- i) Ivory marline spike, Ruggles Outlet.
- j) Whale epiphysial disk plate, vicinity of Fort Conger.
- k) Ulu, antler handle and iron blade, House 2, Site TkAu-1, Ruggles Outlet.
- l) Dog trace toggle, House 2, Site TkAu-1, Ruggles Outlet.
- m) Toggle, House 2, Site TkAu-2, Ruggles Outlet.
- n, o, p) Three whale bone combs, Ruggles Outlet, east bank.

significant to note that Lethbridge (1939, p. 195) felt that the midden deposit was so thin on the floors of the "Turnstone Beach" houses that they may have been occupied only in autumn.

An alternative winter settlement area for the Lake Hazen people would, of course, be Inglefield Land and the Thule vicinity, but our limited data do not indicate that the Grant Land peoples shared the cultural climaxes demonstrated for northwest Greenland.

Some explanation should be sought for the termination of hunting trips to northeast Ellesmere Island. Apparently Eskimos used the region only for a relatively short part of the northwest Greenland prehistoric continuum. A sudden change in temperature might be the answer, but the present inter-relationship of water, permanent snow, and land seems to be exactly that of the period of occupation. The increased run-off of a warmer period would produce wider valleys, the reduced run-off of a colder period narrower ones, but the prehistoric habitations stand at the edge of present stream-banks and glaciers. Greely suggested that the relatively large number of nearly complete dog sleds (8) found by his expedition and earlier ones implied a large number of casualties among the migrant hunters, since this necessity would be abandoned only *in extremis*. In this he may be right; certainly the only family (House 2—TkAu-1) we know to have lived in the vicinity for many seasons, died there. The Cape York Eskimos of 1818 had no legends of journeys to the northwest. This may be because, with few hunters returning from Lake Hazen, the region gained a reputation as a dangerous and forbidding place. This, or the wiping out of the Alexander Fiord settlement, may be the reason for the fifteenth century discontinuance of hunting trips to the vicinity. There is no sign that the muskox herds declined at that time, although certainly the caribou herds had practically disappeared by the middle nineteenth century, since members of neither the Nares nor Greely expeditions saw any of these animals.

BASIC SUBSISTENCE

Generally speaking, the animals of the land were economically more important to the Lake Hazen Eskimos than were the sea mammals. Arctic hare bones are the most abundant in the middens, but from the earliest times the muskoxen and caribou, in about equal numbers, have supplied the most meat, hides, and material for tools. It is significant to note in this light that 92 per cent of the artifacts in the bone-antler category were made of antler. Unfortunately, the comparative significance of this fact cannot be tested, since comparable information does not appear in the literature. Fox, geese, and inland char were killed in quantities, but no bones of sea fish were found. Seal, mainly of the smaller species, were important only on the sea-coast Lonesome Site, and even here their bones were outnumbered by those of inland animals. Polar bear were hunted to a limited extent on the coast, but there is no evidence that beluga or narwhal were killed in the vicinity. Neither walrus nor right whale remains were found, but the vicinity is probably north of their range. The few narwhal ivory and whale-bone artifacts could be derived from farther south. Surprisingly,

not a single piece of baleen has been reported from any of the archæological investigations of the area. Comparable Eskimo groups from Inglefield Land and Thule made extensive use of this valuable material from early Thule to Inugsuk times.

An important clue to the local food habits comes from the sites in the immediate vicinity of the lake. Here, only an overnight sledge journey from the relatively good sealing grounds of Conybeare Bay, not a single sea-mammal bone was found (with the exception of whale-bone and ivory artifacts). This must mean that, although they may have carried blubber with them on their inland hunting trips, the Eskimo ate no seal meat. Even more revealing is the interpretation from the field data that the occupants at House 2, Ruggles Outlet Site, lived on the lake shore for at least two winters without bringing back a seal carcass to the house. Toward the end of their occupation they apparently did most of their cooking over a drift-wood and willow root fire, rather than over a blubber lamp. It even appears that the occupants were not prepared to hunt seal. The only harpoon point found was an unfinished one, tucked away with a harpoon finger rest in a cache of unfinished tools for later work. The only harpoon socket was an old, crude one, which lay on the sleeping platform. The only artifacts that could be movable harpoon foreshafts are unusual in shape and may be more properly interpreted as marline spikes. The seal probes and narwhal tusk ice-hunting harpoon shafts were stored away on a small storage alcove, and the two peculiar pieces of seal-towing gear appear to have been lost and trampled into the entryway floor long before the death of the occupants of the house.

HUNTING TECHNIQUES: ICE-HUNTING VS. KAYAK OR UMIK HUNTING

The case for ice-hunting (Maupok) versus kayak hunting rests on the harpoon accessories, and the presence or absence of the kayak and umiak. Only a few artifacts point to the use of the throwing harpoon—the harpoon finger-rest from the Ruggles Outlet Site (actually the only *good* evidence), the *possible* polar bear canine tension piece from the Lonesome Site (broken and perhaps wrongly interpreted), the three harpoon sockets (from Lonesome, Gilman East, and Ruggles Outlet sites), and two atypical movable foreshafts (*or* marline spikes) from the Ruggles Outlet Site. The nostril pin and the neck or navel piece of the towing gear from the latter site seem to belong to a highly developed kayak complex (Mathiassen, 1928, p. 203), but on the basis of previous interpretations these must be construed as geographically and chronologically out of place and cannot be adequately interpreted.

On the other hand, the absence of any harpoon-float, or kayak accessories (with the exception of the one dubious harpoon rest from Lonesome Site), and the presence of a greater number of seal or snow probes and narwhal tusk harpoon shafts point to a definite use of ice-hunting techniques. The food animals taken, the smaller seals, and even the narwhal and beluga, can be killed as easily from the ice as from a boat.

Geographical conditions contribute to this line of reasoning. The presence of the umiak seems to be out of the question on the grounds of logic. Indications that this point cannot be solved by logic alone come from the peculiar, isolated kayak find on Washington Land (Mathiassen,

1928) and Eigil Knuth's umiak find in Northeast Greenland (Knuth, 1952, pp. 17-33). Working an umiak through the ice-choked channels and bays from either Alexander Fiord or the Greenland coast would be a difficult feat; Greely's problems in navigating the little, umiak-sized launch, *Lady Greely*, from Lady Franklin Bay to Cape Sabine is a case in point. It may be that the umiak did not play an important cultural role even in the permanent settlements of these people. The complete absence of baleen, in a time when baleen played such a useful role in material culture, implies this. At either Alexander Fiord or Inglefield Land, the permanent settlements would still be slightly north of the ranges of the large baleen whales.

The kayak could be used in the Lady Franklin Bay vicinity only in late July and August. Even then, in a bay full of drifting floes and floebergs, it would hardly be an efficient hunting tool. If it were used, there is no one spot where it would be less functional than in the narrow, choked channel between Miller's Island and the Lonesome Site where grounded floebergs last through many seasons. The undisturbed site, on discovery, had no sign of kayak stands, and the line of rocks earlier interpreted as a boat landing, could be, and probably was, a *nangissat* (a line of rocks for playing a jumping game). This particular swale is the best spot on the site for playing this game.

SEASONAL MIGRATIONS

The amber beads and nuggets in the Lonesome Site provide some clues to the life-way, hunting habits, and transportation methods of these people. Since the east end of Lake Hazen is the only source for these water-sorted nuggets, and since they are exposed on the beach only after the snow has melted in the middle of June, the inhabitants must have spent at least a part of the summer on the lake. This would entail crossing the last of the bay ice in late June and back-packing up the dry Black Rock Vale with light gear, back-packing coastward at the end of summer, and either crossing Conybeare Bay by boat, or waiting for freeze-up to cross to the Lonesome Site. An alternative and more logical course would be to leave the Lonesome Site and sledge up the Ruggles Valley in the early weeks of June, spend the summer in tents close to the lake, and return to the fiord with the first sledging snow-cover of late September or early October.

Reconstructing, then, the wanderings of at least the Thule and post-Thule people, we see the following picture: small groups of Eskimo families, normally wintering in more southerly locations, but not far enough south to participate in extensive baleen-whale hunting, would occasionally journey northward to the good caribou and muskoxen grounds of northeastern Grant Land. Either sledging across Kennedy Channel and up the east coast, or along the ice-foot of the western Greenland coast, they arrived and camped in the vicinities of Archer's Fiord, Conybeare, and Lady Franklin bays in the warm months of late April, May, or early June. They killed seal at breathing holes or on the ice basking in the sun, and ate them, and inland game in a picnic atmosphere on the warm, sunny bluff of the Midden V area. While some families may have stayed through the summer on the sea-coast hunting game in the inland meadows, others cached seal on the coast and sledged to Lake Hazen with the last snow of June. While the men hunted, women and children killed small game and picked up lumps

of amber. A few families, fonder of red meat than the others, stayed at the lake for one to three years, while the rest returned to the coast in late September where they stayed a few weeks in the small, semi-subterranean pit houses and more substantial tent rings on the Lonesome Site before sledging south again on the firm, new ice of late October.

CHRONOLOGICAL ASSESSMENT

GEOLOGICAL EVIDENCE

On both typological and geological evidence, the earliest traces of man in the northeast Grant Land – Polaris Promontory region come from the site, on the west coast of Polaris Promontory, discovered and excavated by Eigil Knuth in 1958. He relates the site (pers. comm., and participation in the excavation) to the Independence assemblages of northeast Greenland (Knuth, 1958), and he estimates its age at 3,000 years ago, which seems to be in the right order of magnitude, considering the C-14 dates for the proto-Dorset assemblage at Alarnerk (Meldgaard, 1955).

The Polaris Promontory Site, directly across the channel from Lady Franklin Bay, is located on a high terrace adjacent to a now dry valley, some distance from the present coast. It seems most likely that it was occupied prior to a eustatic readjustment of the promontory on what was then a beach. Polaris Promontory is low, flat, and ice-free, and its post-glacial history must be somewhat different from that of the mountainous Lady Franklin Bay region. However, in the latter region the successively higher alluvial fans of the Lonesome Site, embedded driftwood found by Greely 100 yards [*sic*] above sea-level, and mollusc-covered beaches up to 100 feet above sea-level found by Christie along Chandler Fiord, all attest to eustatic readjustment in the past (Defence Research Board, 1958). If pre-Dorset people migrated from the Bering Straits to northwest Greenland at this time, it is logical to suppose that they crossed via the Hazen Valley. But we found no traces of them. Furthermore, there are few places they could camp on the sea-coast if the sea-land relationship was 60 to 90 feet higher. The higher terraces on the southwest side of the Lonesome Site are an exception, but we searched these carefully, finding nothing. On a flat terrace at 50 feet we found an apparently later tent ring (F 15). Near it, we noted two slabs set vertically in the ground and interpreted them as the remnant of a fox trap. After seeing the vertical stone partitions in Knuth's early houses, we have a strong desire to re-inspect this structure.

The Dorset culture house which Lauge Koch found in the 1920's (Mathiassen, 1928) lies approximately three miles down the coast from Knuth's site. The nearly square stone house, with the whole east side partitioned off with vertical stone slabs for a meat locker, lies near a drying-up lake about seven metres above present sea-level. Koch found nothing but Dorset artifacts in the house, and in 1958 Knuth added one flint micro-blade to the assemblage. Yet, on the basis of the careful framework of chronology from Inglefield Land, this site cannot be younger than 1,000 years. The implication is that in this region the eustatic readjustment was at least 75 per cent complete after 2,000 years.

This hypothesis is corroborated in part by the evidence from the Ellesmere side. The Basil Norris Site, which has produced two Dorset artifacts, lies on an old beach approximately 45 feet above a drying tide flat. However, the relationship between raised beaches and habitations in this region is not necessarily illuminative. Complex 1 on the Lonesome Site produced material no older than 700 years, and yet it is located on an old gravel ridge, 400 feet from the coast and 30 feet above it. Conversely, Complex 6, which produced most of the typologically datable material from the site, presumably of the same age, is 10 to 20 feet above sea-level and so close to the coast that it must have been occupied when topographic conditions were essentially as they are at present.

The lake region itself, now 520 feet above sea-level, provides some clues to the age of the habitations. Topography at the northeast end of the lake and down Black Rock Vale indicates that the lake once stood 50 feet higher, with its major outlet down Black Rock Vale (Defence Research Board, 1958). Conceivably this stage might be correlated with the melting of the Polaris Promontory ice and with an Altithermal period of approximately 4,000 years ago. At some time subsequent to this, the lake dropped to about 6 feet above its present elevation, from the evidence at the Gilman Delta, and the run-off from the melting Grant Land glaciers was enough to cover the alluvial fan of the Gilman and to cut wide, shallow channels in the present surface. These braided channels, now dry, appear very modern. However, the old, round large-rock house (F3) on the west side of the delta is located in the middle of one of these swales and must be more recent than the period of greater run-off. The house was filled with 3 feet of stratified, wind-blown sand, which could only blow in during the three summer months, and is probably at least as old as the 1,000 years indicated by typology. On the east side of the delta, the Dorset and early Thule material lay under 6 inches of humus (an unusual humus depth for the region) at the edge of the present river-bank. This bank is now eroding, and the midsummer river level is only 2 feet below the surface of the site. The house could not have been built at a warmer time when the quantity of melt-water from the glacier was greater.

The close proximity of the tent ring in Dryas Valley to a glacier face is further evidence that the glaciers have either been static, or advancing since the first Eskimo occupation of the valley. The typology correlates well with the inference from the northern Ellesmere shelf (Crary, 1955, pp. 1171-73), that about 1,000 years ago the climatic cycle shifted from a warmer to a colder trend. The archaeological evidence coupled with hydrology indicates that this trend has been manifested in either a static ice condition, or a slight advance.

The heavy sod line at the base of the wind-blown sand in F3, Gilman West Site, and the thick layer of moss sod on the lowest floor of House 2, Ruggles Outlet Site, indicate a progressive drying of the climate within the past 1,000 years. This tends to corroborate the evidence from Greenland where the same phenomenon has been noted (Holtved, 1944, p. 41). Conditions inside the Gilman West house also indicate that Lake Hazen may have been 3 to 4 feet higher within this period. The house interior was filled by ice-shoved gravel after one foot of sterile sand had blown into the empty house. The evidence is not conclusive; it is possible that a severe storm in the right season could produce such an ice-shove ridge today. Certainly

the lake-level has not exceeded its present high-water mark for the past 600 to 800 years since the oldest floor of House 2, Ruggles Outlet Site, is only 10 inches above the present early August level. There has been a minor modification in the river outlet at this location. Gravel is building up on the west bank, and the east bank is eroding. However, this has largely taken place during the last century since Greely found three houses, partially washed away by the river, on the east bank in 1882, and there is now no sign of them.

House 2 furnishes us with an important clue to the little-known physics of patterned ground. At some time between Occupation 1 and Occupation 2, a wedge-shaped dike of clear ice thrust up from beneath, cracking the permafrost and active layer to a depth of 3 feet for a length of approximately 50 feet. This frost crack followed a zone of weakness caused by a small cooking alcove in the south wall and the 12-foot-long entryway. From the archæological material, this crack occurred 650 to 700 years ago. Since that time the crack has remained open, static in position, and the clear ice has remained constantly frozen.

In conclusion, topographic, hydrological, and glacialogical factors indicate that the Eskimo material from Lake Hazen can be no older than the trend toward adjustment to present climate. Typological analogy with other archæological material indicates that the lower limit of this period is in the order of 1,000 years. Since that time, lake and stream levels have been essentially as they are today. At least some of the frost cracks and patterned ground phenomena took place 600 to 800 years ago (there is a frost-cracked tent ring on the Lonesome Site, F17), and the cracks have remained static and open since that time. There is some indication that these cracks are caused by up-thrusting ice dikes in response to trenches in the active layer, which expose lower soil layers to a greater ambient cold. Further search for Paleo-Eskimo remains should concentrate on terrain 6 to 50 feet above the present lake-level, and 50 to 90 feet above sea-level in the fiords.

CHRONOLOGICAL FRAMEWORK

The careful excavation and interpretations of Collins, Holtved, Mathiassen, and Knuth, to single out the major workers in this general eastern region, have provided us with a chronological framework for the Lake Hazen material. Holtved's detailed analysis of the material from Inglefield Land and Thule is particularly pertinent, since we find there the greatest typological similarity with the northern Ellesmere material. Lethbridge's artifacts from the Turnstone Beach Site are significantly different from the Lake Hazen assemblage (Lethbridge, 1939). The only other collection from Ellesmere Island (Bentham and Jenness, 1941) comes from the south coast, Craig Harbour, and seems to reflect much of the archæological continuum in the Thule district from Dorset to recent times. This site seems to be directly influenced by the Thule centre, as presumably are the Lake Hazen sites, and is of less value in determining relative chronology than the northwest Greenland sites.

Essentially the chronological framework is as follows:

1. *Pre-Dorset*. Independence I and Sarqaq on Disko Bay (Meldgaard, 1952)—c. 3,000 years old.
2. *Dorset*. Sites: Washington Land, Inglefield Land, Disko Bay (Larsen and Meldgaard, 1958; Mathiassen, 1958), and Cornwallis Island, and artifacts from Thule, Devon Island, and southern Ellesmere Island—earlier than 1,000 years ago.
3. *Early Thule*. Sites: Inglefield Land and the Canadian Archipelago (Collins, 1950)—c. 1,000 to 900 years ago.
4. *Early Transitional Period*. Norse trade goods arriving in Inglefield Land—c. 800 years ago (thirteenth century).
5. *Ruin Island Period*. Migration of Western Eskimos—sites on Cornwallis, Ruin, and Nugdlit islands—c. 700 years ago (fourteenth century).
6. *Inugsuk*. Period of distinctive late Thule development with strong Norse influence. Sites at Thule, Inugsuk, northeastern Greenland, Craig Harbour, and sites of equivalent age in the Canadian Archipelago—c. 600 years ago (fifteenth century).
7. *Late Transitional Period*. Eastern Thule culture developing into that of the recent Polar Eskimo, break of contact with Upernavik and the southern coast of Greenland. Sites at Thule and Craig Harbour—c. 500 years ago (sixteenth century).

While this framework is not equally acceptable to all the workers in the field, we have no evidence from the Lake Hazen region with which to challenge it. Unfortunately, the bulk of artifacts show little stylistic change from beginning to end, although style trends are apparent. Thus, the pegged shoe for the dog sledge is more common early, the lashed shoe more common late. The findings from Lake Hazen are usually too meagre to be convincing when compared with trends. The negative evidence is similarly suspect. The distinctive side-bladed Thule knife (as distinct from the much earlier Dorset side-bladed knife) is late (fifteenth century) in the stratified Comer's Midden at Thule. The fact that a respectable number of knives from the Lake Hazen region included none with side-blades suggests, but does not prove, that the material was earlier. Generally speaking, the few diagnostic items plus the suggestion of trends enable us to relate this material tentatively with the established chronological framework.

CHRONOLOGICAL ASSESSMENT BY SITES

Basil Norris Site (TkAp-1)

We have only scanty surface finds from two expeditions on which to base chronological assessments of this site. Fortunately, two of the artifacts, the Dorset harpoon head (Greely) and the Dorset fish-harpoon (TkAp-1-1), are diagnostic. Typologically the closed socket harpoon head with double-line hole at right angles to the socket is middle to late in the

Dorset sequence (William E. Taylor, pers. comm.), and the fish-harpoon continues to late Dorset (O'Bryan, 1952). Other artifacts are less easily placed. Greely found what appears to be part of a Thule Type 2 harpoon head, normally associated with the earliest Thule, but this also continues into later Thule time. In 1958, we found what appears to be a very large side barb for a fish spear, with holes and a flanged "neck." In a much smaller form this appears for the first time in the Inugsuk period at Comer's Midden. However, it is earlier in the west (Alaska) than at Thule and may be making an early appearance on Ellesmere Island. Obviously we do not have any assurance that the few surface finds all belong to the same period. It seems reasonable to see Dorset influences here, if not a Dorset occupation, that began about 1,000 years ago. Later Thule people may also have visited the site for the wealth of driftwood trapped in the deep bay.

Trait list:

(TkAp-1 numbers given to material found in 1958, G to materials found on the Greely Expedition 1881-1883).

Dorset fish-harpoon—TkAp-1-1

Dorset harpoon head—(G)

Thule Type 2 harpoon head fragment—(G)

Salmon spear side barb with holes and neck—TkAp-1-2

Soapstone lamp sherds with large wick ledge—TkAp-1-4

Bone wedge—TkAp-1-3

Bone sledge runner drilled with 42 holes—(G)

Pointed ivory harpoon foreshaft, rounded butt, one hole—(G)

Ice pick with triangular butt—(G) (Early Thule, but persists to sixteenth century)

Two walrus tusk ferrules—(G)

Wooden scoop—(G)

Gilman East Site (TlAt-3)

The material from this site, although limited, is in the main diagnostic of the tenth to twelfth centuries. The three-pronged leister from F5, with its elongated, gouged lashing holes, and gouged line hole on the lateral margin is undoubtedly Dorset, although the artifact has not been previously reported from Dorset sites. The composite knife handle developed in Alaska (Collins, 1950, p. 3) occurs in this shape, usually in ivory or bone, in Dorset and early Thule sites in Canada and Greenland. The whale bone composite knife handle associated with the Dorset leister may indicate a Dorset - early Thule association. The same could be said of the composite whale-bone knife handle with pegged whale-bone support-piece from F6. The support-piece is similar in shape to ivory pieces from the Dorset Site T1 on Southampton Island (Collins, 1956), but the whale bone and the peg fitting into a drilled hole are Thule traits. Collins illustrates an ivory composite knife handle from Frobisher in which the support-piece is apparently pegged, although not through the blade (Collins, 1950, Plate VII, No. 7). The heavy, scarfed harpoon socket, from the surface of the site, occurs in Inglefield Land and in Comer's Midden from early Thule through late transitional, although it is more characteristic

of the early periods. It does not occur in the Thule District in this peculiarly squared form. Other artifacts from the site are less diagnostic. Nor are there distinctive architectural features other than the fact that F5, from the depth of humus along its one wall, is very old; the carefully-built tent ring F6 is younger, but apparently somewhat older than the Features 1 to 4 which are built on the present surface.

Trait list:

- Antler three-pronged leister (centre prong lashed in, now missing)
—Dorset
- Two whale-bone composite knife handles, one with pegged support-piece, peg in drilled hole—Dorset to early Thule
- Heavy, scarfed harpoon socket—Thule to late transitional
- Scarfed ice-pick fragment—Thule to late transitional
- Small end-blade knife (?)
- Flat piece of drilled whale bone
- Antler shaft fragment
- Chert side scraper(?)—Dorset and early Thule
- Wooden harpoon shaft with scarfed end and peg holes—Found as driftwood 5 miles east of site, but typologically belongs with it.

Gilman West Site (TlAt-1)

Only two cultural traits, the oval pit house and the delicately re-touched chert end scraper, can be assessed for this site, but both point to a date of about 1,000 years ago. Chert end scrapers are most characteristic of the Dorset midden on Inglefield Land, although three appear in Ruin Island, and one, without the delicate retouch, in the Inugsuk period. The fact that the few food bones in the house were nearly disintegrated, and that the house was filled with 3 feet of wind-blown sand indicates the older age. Round pit houses are thought to be the early, basic house-form in the northwest Greenland vicinity. Future research in the Hazen area should concentrate on such large-rock, circular rings as the one reported in 1957 by Christie (General vicinity of Map 2, No. 10) and the ring at the Turnstone Site (TjFb-1).

Lonesome Site (TjAq-1)

Little of the artifactual material from this site is diagnostic of any specific period. In part, this reflects a general participation in the continuum of Thule culture, but from a position marginal to the florescences of the kayak complex, the whale hunting complex, and the Norse-Inugsuk influences. Nearly one-third of the traits from the Lonesome Site are not found in the Thule District. Most of these, such as the use of one piece of birch bark from a drifted log, of quartz crystals weathering from local rock, and of one piece of light, drifted rock for a toggle, are probably coincidental and of little significance. Other unique traits show only a local development, and not influences from the central Thule region to the south and west.

Thirty-six artifact traits are listed for the site, on the presumption that the few structures with associated artifacts are roughly contemporaneous. Eleven of these have not been reported from northwestern Greenland sites:

- Narwhal ivory dart head, or toy harpoon head
- Polar bear canine tension piece (?)
- Antler harpoon rest (?)
- Stone toggle, one hole (a similar toggle of walrus molar from the early transitional period of the Thule District)
- Whale-bone snow-probe with rectangular, antler handle
- Goose ulna sucking tube
- Ajagaq stick of cetacean pelvis
- Amber beads in quantity (67) (one amber bead in the early transitional period of Thule, one at Nugdlit)
- Ivory bead
- Cut birch bark
- Quartz-crystal gravers

Greely's party also found a whale-bone snow-probe with rectangular antler handle (Cape Baird), and a cut piece of birch bark (Discovery Harbour), and we found amber beads at Lake Hazen (House 2, Ruggles Outlet Site).

Six of the thirty-six traits occur in the Thule District from the earliest Thule to the most recent layers and are of little significance for chronology:

- Harpoon ice-pick with scarfed butt
- Scarfed-tang small projectile points, or fish spear side barbs
- Pegged, whale-bone sled shoes
- Wooden doll without feet or topknot
- Bone mountings of various shapes
- Antler bow brace

Three traits occur in the sites from early Thule to late transitional times:

- Pyrites crystal
- Wooden doll with feet and topknot, female
- Seal (2) and fox (1) teeth pendants

Seven traits occur in the Thule District from early transitional layers to late transitional layers:

- Harpoon heads, flat, with closed socket, single line hole, two bifurcated dorsal spurs (2)
- Harpoon socket, short, cylindrical
- Arrowhead, conical tang with knobs, round
- End-bladed knife, without suspension hole
- Ajagaq, seal radius
- Bone or antler edge mountings
- Antler end scraper

One trait, the deep, oval lamp with wick ledge occurs only from early transitional time through Inugsuk; the iron drill point occurs only in early Thule, and the flint hand drill or reamer(?) only in early transitional time. Additional traits are: bone sled shoe nails and pegs, unworked lumps of amber, wood fragments including arrow shaft parts, harpoon shaft fragments, pail handle and others, a piece of cut muskox horn, and five unworked caribou incisors.

Against this limited assemblage we can project the trends noted in the Thule District. Only one of the flat harpoon heads was found in the early transitional layers, and this was at the top of the period. The type, and particularly the illustrated harpoon heads most like those from the Lonesome Site, are characteristic of the early Inugsuk period. Holtved considers this a western type, and it might be somewhat earlier on Ellesmere Island. Pegged sled shoes predominate over lashed shoes at the early end of the continuum, as does the greater prevalence of wood. (Driftwood was common enough to burn in open fires at the Lonesome Site.) There is little specialization of the kayak complex, and more emphasis on inland hunting in the earlier periods, but the short cylindrical harpoon socket tends to prevail in Inugsuk time, and edge mountings appear in numbers at the beginning of Inugsuk. Although wooden female dolls with topknots appear in early Thule, they are most characteristic of the beginning Inugsuk period, and the ajagaq made of a seal radius is rare in the early transitional period but common in the Inugsuk.

Significantly absent are all of the most characteristic objects of the developed Inugsuk complex: Norse objects (the iron drill point has not yet been assayed but probably is European in origin), the side-bladed knives (which constitute 40 per cent of all knife types in the upper layers at Thule), tub staves, a plethora of baleen objects, advanced kayak technology, long-handled antler spoons, and ornamental bodkins.

Identifiable material from the Greely expedition, from the Lady Franklin Bay region, tends to reinforce our assessment of traits to the general early transitional—early Inugsuk period. Two traits trend toward the early side, the wooden lance socket or stiletto handle (Thule to early transitional) and two antler sledge upstanders (found only in the early Thule of Inglefield Land).

The architectural features provide few clues. The small winter(?) house, F11, had a separate cooking alcove, or "kitchen," near the entryway, a trait that comes into the Thule District with the Ruin Island people (fourteenth century). Furthermore, Holtved (Holtved, 1954, p. 103) describes small subterranean summer dwellings like F11, 12, 21, 22, 23, 24, and 30, from Nugdlit Island (fourteenth century) saying that "these have not been described before, as far as I know."

In summary we would estimate that at least Complex 6 of the Lonesome Site, and probably all of the material traits recovered, belong to the general early transitional—early Inugsuk time of the Thule District (A.D. 1250 to 1400); that other artifacts from the Lady Franklin Bay suggest seasonal visits in the same general time period, with some migrants possibly coming to the area just before the transition to Inugsuk culture.

Ruggles Outlet Site (TkAu-1)

There is little on which to base a chronological assessment of the first building stage of House 2, and traits that have been considered diagnostic elsewhere are contradictory here. At the very least, we can say that the builders had a Thule-type culture as indicated by whale-bone and drilled artifacts on the earliest floor.

There are a total of 16 artifact traits. Two of these, the undrilled polar bear canine, and the unmodified caribou scapula which may have been used as a shovel, are of no value in dating. Two seem to be unique, the double-conical ivory drill mouthpiece and the wooden pail rim, and cannot be used in comparative dating. Five general traits occur in the Thule District from early Thule to recent times and are part of the basic continuum. These are as follows:

- Scarfed base, round projectile points or fish spear side barbs (2)
- Soapstone lamp patch
- Drilled antler mounting
- Antler meat hook
- Whale-bone sled slat

Of the remaining traits, the flat marline spike (so interpreting the crude ivory splinter TkAu-1-98) occurs from Thule to late transitional time; the wooden stiletto or lance socket only in Thule or early transitional time; the fire drill only in early transitional time (although wooden fire-boards or hearths appear in Ruin Island and Inugsuk), the seal towing toggle (so interpreting the drilled antler piece TkAu-1-73), and the end-bladed knife with an L-shaped flange from early transitional to recent; the knife handle made of two halves in Ruin Island, and the narrow, broad ulu handle in Inugsuk to recent times.

In this group of traits, the emphasis, since the house is the earliest of three, is on the early transitional period, with the exception of the ulu handle. This may, of course, represent an early appearance of the form. Its presence in this layer may also be a function of interpretation of the field situation. It lay in a distorted area of uptilted rock slabs under a wide crack of both the Occupation 3 and Occupation 2 sleeping platforms. It was ascribed to the earliest occupation because of the midden debris that covered it, but it does not belong so definitely to the first occupation as do the other artifacts.

The architecture provides one hint to its age. The open fireplace for this building stage is located outside the north wall, and the lamp platform against the south wall is well defined. In the third occupation of the house, the open cooking fire is inside the structure. Since interior fireplaces appear in the Thule District with the Ruin Island people of the fourteenth century, the implication is that this first building stage precedes the Ruin Island complex, or that the people have not yet felt its impact. This leaves us with an estimate of A.D. 1250 to 1350 for the first occupation of the house.

Of the eleven artifact traits that can be assigned with assurance to the second building stage, some are diagnostic. The wooden fire hearth is restricted to the Inugsuk period (although Holtved considers this coincidental since fire drills appear earlier); the amber bead appears only in

early transitional and Nugdlit (Ruin Island); the antler fish spear side barb with peg hole and flange or neck is unique and may be a transitional form. Side barbs with holes appear in Thule and early transitional; those with holes and a neck in Inugsuk. The antler meat stick (2) occurs from Thule to the beginning of Inugsuk; the whale-bone snow beater with L-shaped butt flange in early Inugsuk. The other traits, the ivory snow-knife tip, antler nail, antler sled slat, two antler end-bladed knives with and without suspension holes, the ivory dog trace buckle, and the carved ivory tension-piece, are not diagnostic.

The estimate for this period of house construction seems clearly to be the general Ruin Island—early Inugsuk period, or A.D. 1300 to 1450, if Holtved's chronology is accurate.

The artifacts from the third occupation apparently constitute the total material wealth of one family. In this assemblage there are some notable lacunae. For example, we found no needles, but these might have been tiny slivers of iron that have rusted away. One would also expect to find the man's adze, bow, lances or arrows (ready for use), drill bow and other artifacts of daily use, but these are missing. Actually, the only man's gear in the house were artifacts stored away for later use, or, like the astragalus drill socket and iron-bladed whittling knife, lost and forgotten in the entryway.

The trait list from this occupation includes 56 items. Three of these, the bone and antler pegs and nails (4), the broken ivory pendant, and the unworked seal canine, have little significance for chronology. Seven of the traits do not occur in the Thule District. These are as follows:

- The nostril pin of the seal-towing gear
- Narwhal ivory sledge draft-line toggle
- Ivory button for snow-knife suspension line.
- Antler pail handle
- Needle case of charred antler
- Whale-bone comb with T-shaped handle
- Antler pounder (?)

Fifteen of the traits occur from Thule to recent layers and are significant core traits but unusable for typological dating. These are as follows:

- The neck or navel piece of the seal towing gear (although the shape of the artifact from Lake Hazen is distinctive)
- Leister side prongs (2)
- Scarfed-tang projectile points, or fish spear side barbs (6)
- Ivory and whale-bone snow-knife tips (2)
- End-bladed knife with slit (flensing knife)
- Drill shaft, wood
- Caribou astragalus drill socket
- Meat stick, muskox rib
- Antler hook
- Whale-bone sledge shoe, pegged
- Whale-bone sledge shoe, pegged and lashed
- Whale-bone comb with double convex handle

Whale-bone sledge slat

Narwhal tusk ice-hunting harpoon shaft

Rounded, four-sided soapstone bowl with interior suspension holes.

Seven traits occurring from Thule to late transitional times are equally of little value chronologically:

Arrow point, conical tang, knobbed, symmetrical blade

Arrow point, conical tang, knobbed, egg-shaped head with blade slit

Fish needles (4)

Dog trace buckles, walrus and narwhal ivory (2)

End-blade knife, "whittling type," iron blade

End-blade knife, "old type"

Seal probe shaft, whale bone (2)

Seven traits occur from early transitional layers to late transitional layers:

Harpoon socket, short, cylindrical

Harpoon finger rest

End-bladed knife with L-shaped handle

Drill, antler shank

Thimble holder, anchor-shaped

Edge mounting, antler

Soapstone lamp (?), deep, no wick ledge

Six traits begin in Thule layers and end in Inugsuk time:

Harpoon head, unfinished, thin, closed socket, single spur, lateral keel (?)

Harpoon foreshafts, or marline spikes (2)

Arrow point, conical tang, knobbed, asymmetrical blade

Snow knife, two shoulders, angled handle

Bow brace, antler

Winged needle case (but style continues later in southwest and northeast Greenland)

One trait, the wooden sledge runner, occurs from early transitional to Inugsuk in Comer's Midden, although undoubtedly lasts later in time.

Five traits appear only in the Ruin Island material:

Sinew twister, ivory, with central hole (Nugdlit)

Amber beads (5) (one in an early transitional house at Thule, one at Nugdlit)

Unworked amber (100)

End scraper, muskox tibia (Nugdlit)

End scraper, antler (Nugdlit)

Five traits are restricted to the Inugsuk period at Thule:

Fish spear side barbs, holes and neck (2)

Ulu, broad antler back, iron blade (this shape, without the iron blade also appears in early transitional)

Iron drill point (previously counted with the antler drill shaft)
 Wooden fire hearth
 Narwhal sucking tube (two nearly identical found in the bottom
 Inugsuk layer at Comer's Midden)
 Boat-shaped wooden bowl

The five traits from the Ruin Island period and the twelve terminating in the Inugsuk period constitute 30 per cent of the traits that are apparently not later than Inugsuk time. The occurrence of some of the traits, treated here in broad periods, actually occur in layers dated from early to middle Inugsuk time. These are the flat marline spike with hole (?), fish spear side barb with holes and neck, ulu with iron blade, boat-shaped wooden bowl, and antler hook which disappears in early Inugsuk time and then reappears in the recent nineteenth century.

Architectural traits also point to a general fourteenth to fifteenth century period. The well-designed, symmetrical house trending toward a four-sided plan resembles the Cape Kent houses, and the west wall which defines an open fireplace kitchen is a Ruin Island trait.

The absence of diagnostic traits of the well-established Inugsuk complex, such as the decorative bodkin, tub staves, side-bladed knife, long-handled antler spoon, baleen saw, and carved animal figures, seems to put an upper limit on the Lake Hazen assemblage. On the other hand, the large plank sled runners, iron knife and ulu blades, and drill point, all likely of European origin (although not yet analysed), point to trade either with Norse, or with Eskimos possessing Norse materials. Our estimated age for this house stage would be in the same general period as the second house stage—A.D. 1300 to 1450, but specifically twenty to fifty years after the second stage.

SUMMARY AND CONCLUSIONS

An archæological reconnaissance survey of northeastern Grant Land, Ellesmere Island, covered the shore and foothills of the eastern two-thirds of Lake Hazen, the shores of bays and fiords in the Lady Franklin Bay vicinity, and the major valleys between the lake and the sea-coast. The entire periphery of the lake was inspected in a low-level aerial survey, and interested members of the expedition investigated additional ground including the shores of Clements Markham Inlet (on the north coast) and the broad valley west of the lake. Thirty-three sites of prehistoric structures including three, and possibly four, winter houses were investigated. (Two winter houses built by Peary's Eskimos in 1906 were also located.) We found no trace of pre-Dorset or proto-Dorset and consider it doubtful that early migrations from the west passed through the Hazen Valley. Raised lake- and sea-levels may have precluded such early passage, but future researchers should take into consideration the possibility that the lake-level was 6 to 50 feet higher, and the sea-level 60 to 90 feet higher.

The earliest indicated occupation of the area took place approximately one thousand years ago by people with a middle to late period Dorset culture. Dorset evidence lay on the surface of Basil Norris Bay; buried under 6 inches of humus on the east side of the delta south of the Gilman Glacier;

and in a possible Dorset house on the west side of the same delta. There is no substantial evidence of a Dorset settlement. In all probability the remains are those of seasonal migrants to the area after the period of established Dorset culture in northwest Greenland. This same delta bears evidence of a limited, seasonal use of the lake by Eskimos with tools characteristic of the early twelfth century Thule complex on Inglefield Land. From the available evidence it is impossible to separate the Dorset and Thule occupations, and the people may have had a mixed assemblage of artifacts.

Eskimos from an as-yet unexcavated, or unidentified, settlement made a limited, seasonal use of the region in the period comparable to that covered by the stratified Comer's Midden from the transition of Thule to Inugsuk culture through the middle part of the Inugsuk development. Although the artifacts bear a closer resemblance to those of northwestern Greenland than to the assemblages of Canadian Thule, a certain marginality can be noted. Thus, some of the traits are unique and apparently locally developed; others are significantly absent. The Eskimos of the Lake Hazen region, although spanning the time period of climaxes of distinctive artifact developments in the Thule District, do not seem to have shared in these climaxes. In the Thule and early transitional period the distinctive harpoon type, the kayak complex, the use of baleen, and the plethora of toys do not appear in the Lake Hazen region. In the Ruin Island period the artifacts of an accelerated whaling complex, distinctive harpoons, elaborate bone and ivory carving, and flint tools do not enter the Lake Hazen assemblage. In the Inugsuk period the most distinctive elements, the ornamental bodkin, tub staves, chess men, side-bladed knives, antler spoons, baleen saws, and carved animal figures, fail to reach this far north. And yet, as might be expected with a marginal group, the Lake Hazen Eskimos appear to share in the core development of all these periods.

In the light of previous theories we considered it a foregone conclusion that evidence of early migrations lay in this little-explored region. At least four major migrations are known to have passed through the Canadian Archipelago to Greenland: the pre-Dorset, Dorset, Thule, Ruin Island, and probably several lesser migrations from west to east. Since northeastern Ellesmere lies closer to the Greenland coast than any other part of the Archipelago, and since the low Hazen Valley makes an easy crossing, this supposition was logical. However, we found no evidence of such migrations and, in the light of the region covered by the survey, consider it unlikely that these movements took place through the region. Rather, the Lake Hazen valley appears to have been a cultural cul-de-sac, used as a seasonal hunting ground by people marginal to pervasive settlements on Greenland. These hunting trips stopped in the mid-fifteenth century for unknown reasons, and the region was even forgotten in Eskimo legend. It has remained uninhabited by Eskimos except for the brief period of Peary's expedition and for sporadic hunting trips in the twentieth century.

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PLATE IX

(The black rectangle in all plates is 2 inches—5 cm long)

- Fig. 1. Harpoon point (TjAq-1-33), tent ring F29, Site TjAq-1, Lonesome Creek.
- Fig. 2. Harpoon head (TjAq-1-56), tent ring F31, Site TjAq-1, Lonesome Creek.
- Fig. 3. Harpoon dart head (?) (TjAq-1-38), Midden V, Site TjAq-1, Lonesome Creek.
- Fig. 4. Dorset fish harpoon head (TkAp-1-1), surface, Site TkAp-1, Basil Norris Bay.
- Fig. 5. Unfinished harpoon head (TkAu-1-69), west cache, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 6. Ivory harpoon foreshaft, or marline spike (TkAu-1-1), surface outside House 2, Site TkAu-1, Ruggles River.
- Fig. 7. Ivory harpoon foreshaft, or marline spike (TkAu-1-22), floor, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 8. Harpoon socket (TjAq-1-55), outside east wall tent ring F31, Site TjAq-1, Lonesome Creek.
- Fig. 9. Harpoon socket (TlAt-3-3), surface of F4, Site TlAt-3, east side of Gilman Delta.
- Fig. 10. Harpoon finger-rest (TkAu-1-70), west cache, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 11. Harpoon socket (TkAu-1-19), east sleeping platform, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 12. Wooden wound pin (TlAt-3-7), surface F4, Site TlAt-3, east side of Gilman Delta.
- Fig. 13. Harpoon ice-pick (TjAq-1-81), tent ring F35, Site TjAq-1, Lonesome Creek.
- Fig. 14. Navel piece of seal-towing gear (TkAu-1-51) entryway, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 15. Part of seal-towing gear (?) (TkAu-1-73), beneath floor House 2, Occupation 1, Site TkAu-1, Ruggles River.
- Fig. 16. Nostril pin of seal-towing gear (TkAu-1-50), entryway, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 17. Dorset fish spear (TlAt-3-12) under floor F5, Site TlAt-3, East side of Gilman Delta.
- Fig. 18. Fish spear side prong (TjAo-1-1), surface, Site TjAo-1, Archer Fiord.
- Fig. 19. Fish spear side prong (TkAu-1-68), west cache, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 20. Broken fish spear side prong (TkAu-1-111), east cache, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 21. Salmon spear side barbs (TkAu-1-61, TkAu-1-62), entryway, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 22. Salmon spear side barb (TkAu-1-87), floor, House 2, Occupation 2, Site TkAu-1, Ruggles River.
- Fig. 23. Salmon spear side barb (TkAp-1-2), surface, Site TkAp-1, Basil, Norris Bay.



PLATE X

- Fig. 1. Scarfed-tang projectile point, or salmon spear side barb (TjAq-1-39), surface near F7, Site TjAq-1, Lonesome Creek.
- Fig. 2. Scarfed-tang projectile point, or salmon spear side barb (TjAq-1-85), Midden V, Site TjAq-1, Lonesome Creek.
- Fig. 3. Scarfed-tang projectile point, or salmon spear side barb (TkAu-1-84), west fireplace, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 4. Scarfed-tang projectile point, or salmon spear side barb (TkAu-1-88), west fireplace, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 5. Scarfed-tang projectile point, or salmon spear side barb (TkAu-1-10), inside storage locker, House 2, Occupation 1, Site TkAu-1, Ruggles River.
- Fig. 6. Scarfed-tang projectile point, or salmon spear side barb (TkAu-1-28), under floor slab, House 2, Occupation 1, Site TkAu-1, Ruggles River.
- Fig. 7. Conical, knob-tanged, projectile point (TjAq-1-60), tent ring F33, Site TjAq-1, Lonesome Creek.
- Fig. 8. Asymmetrical, conical-tanged, projectile point (TkAu-1-105), east cache, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 9. Double-bladed, knob-tanged, projectile point (TkAu-1-106), east cache, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 10. Ivory button for snow knife lanyard (TkAu-1-38) associated with snow knife, east sleeping platform, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 11. Whale-bone snow knife (TkAu-1-37), east sleeping platform, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 12. Composite projectile point (TkAu-1-102) east cache, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 13. Fish stringing needle (TkAu-1-64) entryway, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 14. Fish stringing needle (TkAu-1-25), east sleeping platform, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 15. Fish stringing needle (TkAu-1-85), west fireplace, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 16. Fish stringing needle (TkAu-1-57) entryway, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 17. Wooden stiletto handle, or lance foreshaft (TkAu-1-12), under floor slab, House 2, Occupation 1, Site TkAu-1, Ruggles River.
- Fig. 18. Narwhal ivory dog toggle (TkAu-1-74) west sleeping platform, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 19. Ivory dog toggle (TkAu-1-75), west sleeping platform, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 20. Ivory dog toggle (TkAu-1-113), west sleeping platform, House 2, Occupation 2, Site TkAu-1, Ruggles River.
- Fig. 21. Narwhal ivory sledge trace buckle (TkAu-1-116), entryway, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 22. Stone toggle (TjAq-1-37), surface Midden V, Site TjAq-1, Lonesome Creek.
- Fig. 23. Tip of ivory snow knife (TkAu-1-29), south wall, House 2, Occupation 2, Site TkAu-1, Ruggles River.
- Fig. 24. Tip of ivory snow knife (TkAu-1-33), floor of south cooking alcove, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 25. Tip of whale-bone snow knife (TkAu-1-63), entryway, House 2, Occupation 3, Site TkAu-1, Ruggles River.

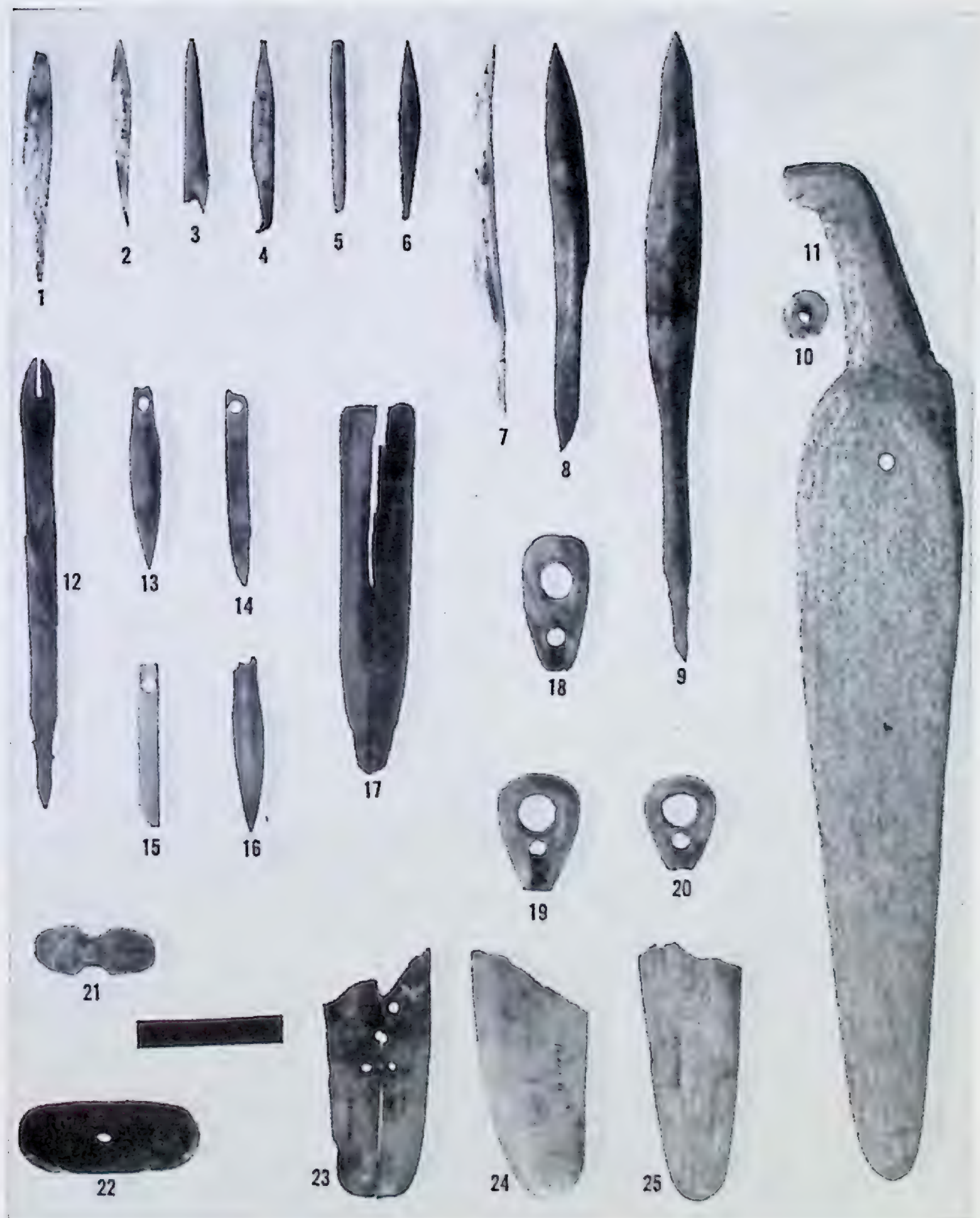


PLATE XI

- Fig. 1. Knife handle (TkAu-1-104), floor, House 2, Occupation 1, Site TkAu-1, Ruggles River.
- Fig. 2. Knife handle (TkAu-1-90), west sleeping platform, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 3. Knife handle (TjAq-1-17), House F2, Site TjAq-1, Lonesome Creek.
- Fig. 4. Knife handle (TkAu-1-91), entryway, House 2, Occupation 2, Site TkAu-1, Ruggles River.
- Fig. 5. Flensing knife handle (TkAu-1-97), north antechamber, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 6. Iron-bladed knife (TkAu-1-79), entryway, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 7. Snow beater (TkAu-1-81), entryway, House 2, Occupation 2, Site TkAu-1, Ruggles River.
- Fig. 8. Ulu handle (split) (TkAu-1-17), east sleeping platform, House 2, Occupation 1, Site TkAu-1, Ruggles River.
- Fig. 9. Fragment of ivory knife handle (?) (TkAu-1-72), entryway, House 2, Occupation 1, Site TkAu-1, Ruggles River.
- Fig. 10. Iron-bladed ulu (TkAu-1-80), east sleeping platform, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 11. Part of composite knife handle (TlAt-3-9), floor F5, Site TlAt-3, east side of Gilman Delta.
- Fig. 12. Part of composite knife handle (TlAt-3-1), floor F6, Site TlAt-3, east side of Gilman Delta.
- Fig. 13. Part of composite knife handle (TlAt-3-2), floor F6, Site TlAt-3, east side of Gilman Delta.
- Fig. 14. Bow brace (TkAu-1-93), entryway, House 2, Occupation 3, Site TkAu-1, Ruggles Valley.
- Fig. 15. Bow brace (TjAq-1-70), south sleeping platform F35, Site TjAq-1, Lonesome Creek.
- Fig. 16. Wooden fire drill (TkAu-1-14), north wall, House 2, Occupation 1, Site TkAu-1, Ruggles River.
- Fig. 17. Wooden fire drill (TkAu-1-34), floor of storage locker, House 2, Occupation 1, Site TkAu-1, Ruggles River.
- Fig. 18. Ivory drill socket (TkAu-1-9), floor of storage locker, House 2, Occupation 1, Site TkAu-1, Ruggles River.
- Fig. 19. Caribou astragalus drill socket (TkAu-1-94), entryway, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 20. Composite drill, wooden shaft, antler foreshaft, and iron bit (TkAu-1-107, TkAu-1-101), east cache, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 21. Wooden drill shaft (TkAu-1-107b), east cache, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 22. Ivory sinew twister (TkAu-1-119), north antechamber, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 23. Wooden fireboard (TkAu-1-13), south wall, House 2, Occupation 2, Site TkAu-1, Ruggles River.



PLATE XII

- Fig. 1. Antler pot hook (TkAu-1-44), tent ring, F1, Site TkAu-1, Ruggles River.
- Fig. 2. Antler pot hook (TkAu-1-65), west sleeping platform, House 2, Occupation 1, Site TkAu-1, Ruggles River.
- Fig. 3. Antler meat stick (TkAu-1-49), entryway, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 4. Bone meat stick (TkAu-1-7), east sleeping platform, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 5. Bone meat stick (TkAu-1-92), south cooking alcove, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 6. Antler pail handle (?) (TkAu-1-8), east sleeping platform, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 7. Narwhal ivory sucking tube (TkAu-1-40), south wall, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 8. Bone sucking tube (TjAq-1-68), tent ring F35, Site TjAq-1, Lonesome Creek.
- Fig. 9. Ivory thimble holder (TkAu-1-3), north wall, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 10. Ivory needle case (TkAu-1-2), north wall, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 11. Charred antler (?) needle case (TkAu-1-122), north antechamber, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 12. Wooden female doll (TjAq-1-80), sleeping platform, tent ring F31, Site TjAq-1, Lonesome Creek.
- Fig. 13. Wooden male (?) doll (TjAq-1-42), surface outside tent ring F33, Site TjAq-1, Lonesome Creek.

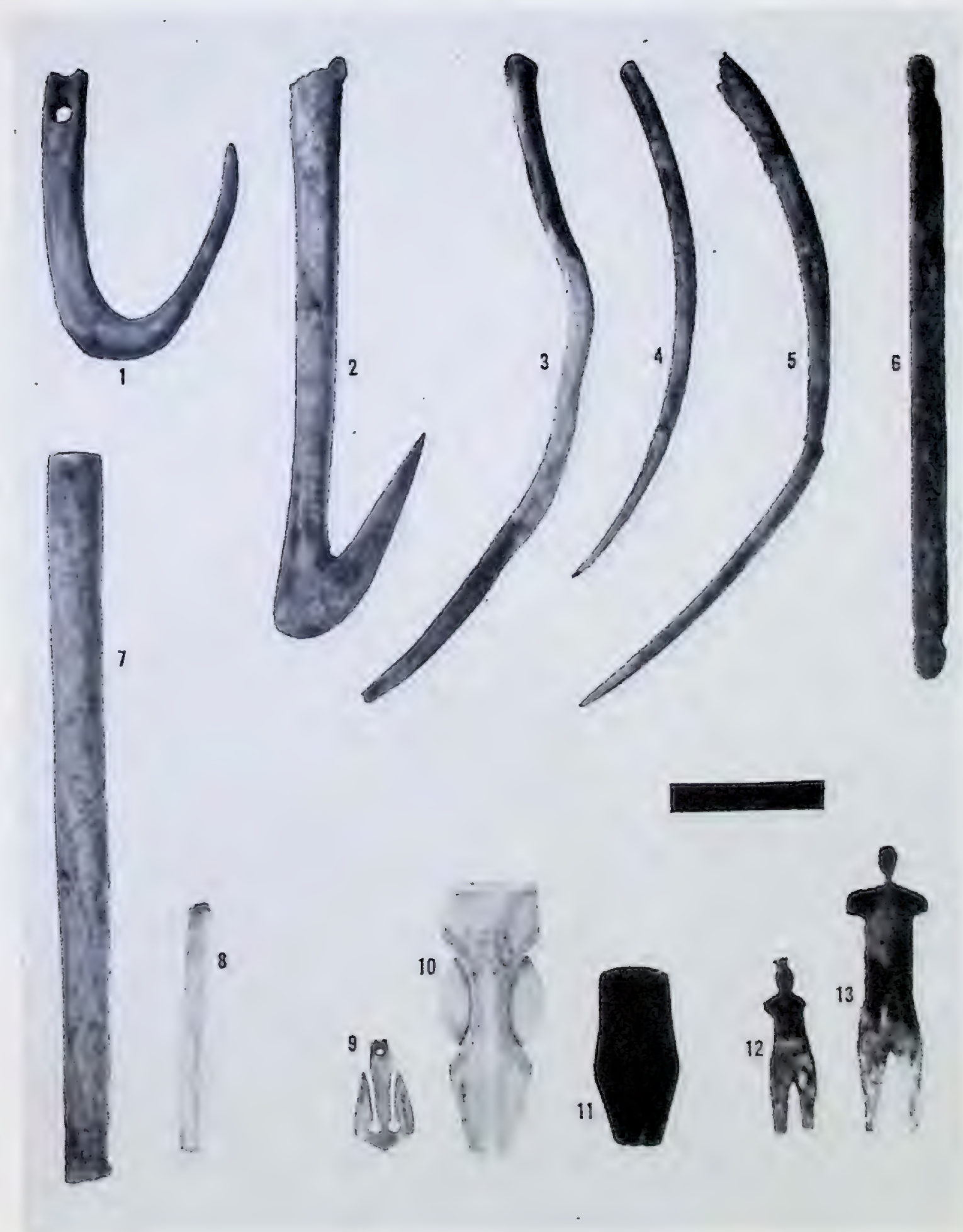


PLATE XIII

- Fig. 1. Seal radius ajagaq (TjAq-1-59), tent ring F33, Site TjAq-1, Lonesome Creek.
- Fig. 2. Cetacean pelvis ajagaq pin (TjAq-1-73), tent ring F33, Site TjAq-1, Lonesome Creek.
- Fig. 3. Whale-bone comb (TkAu-1-118), west fireplace, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 4. Whale-bone comb (TkAu-1-4), east sleeping platform, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 5. Whale-bone comb (TkAu-1-76), west sleeping platform, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 6. Fragment of edge mounting (TkAu-1-110), east cache, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 7. Fragment of bone button (?) (TjAq-1-46), entryway, tent ring F33, Site TjAq-1, Lonesome Creek.
- Fig. 8. Split polar bear canine, harpoon tension piece (?) (TjAq-1-53), Midden V, Site TjAq-1, Lonesome Creek.
- Fig. 9. Fragment of edge mounting with broken iron drill point (TjAq-1-75), cooking alcove, tent ring F33, Site TjAq-1, Lonesome Creek.
- Fig. 10. Edge mounting (TjAq-1-74), tent ring F33, Site TjAq-1, Lonesome Creek.
- Fig. 11. Amber beads (arrow points to one ivory bead) (TjAq-1-57), tent ring F31, Site TjAq-1, Lonesome Creek.
- Fig. 12. Amber beads (TjAq-1-67), tent ring F35, Site TjAq-1, Lonesome Creek.
- Fig. 13. Amber beads (TkAu-1-30), east sleeping platform, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 14. Two seal canine pendants (TjAq-1-24, 25), floor of house F11, Site TjAq-1, Lonesome Creek.
- Fig. 15. Broken ivory pendant (TkAu-1-47), tent ring F1, Site TkAu-1, Ruggles River.
- Fig. 16. Bone mounting (TjAq-1-44), surface F33, Site TjAq-1, Lonesome Creek.
- Fig. 17. Bone mounting (TjAq-1-45), surface F33, Site TjAq-1, Lonesome Creek.
- Fig. 18. Antler mounting (TkAu-1-32), floor of storage locker, House 2, Occupation 1, Site TkAu-1, Ruggles River.
- Fig. 19. Whale-bone mounting (TlAt-3-4), tent ring F4, Site TlAt-3, East side of Gilman Delta.
- Fig. 20. Piece of cut birch bark (TjAq-1-61), floor, tent ring F35, Site TjAq-1, Lonesome Creek.
- Fig. 21. Antler nail or peg (TjAq-1-32), surface, tent ring F10, Site TjAq-1, Lonesome Creek.
- Fig. 22. Antler sled shoe nail (TjAq-1-15), Midden V, Site TjAq-1, Lonesome Creek.
- Fig. 23. Antler nail (TkAu-1-117), south wall, House 2, Occupation 2, Site TkAu-1, Ruggles River.
- Fig. 24. Antler nail (TkAu-1-120), north antechamber, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 25. Fragment of antler peg (TkAu-1-45), tent ring F1, Site TkAu-1, Ruggles River.
- Fig. 26. Fragment of antler peg (TkAu-1-46), tent ring F1, Site TkAu-1, Ruggles River.
- Fig. 27. Bladder-nosed seal canine (TkAu-1-53), entryway, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 28. Polar bear canine (TkAu-1-82), floor, House 2, Occupation 1, Site TkAu-1, Ruggles River.

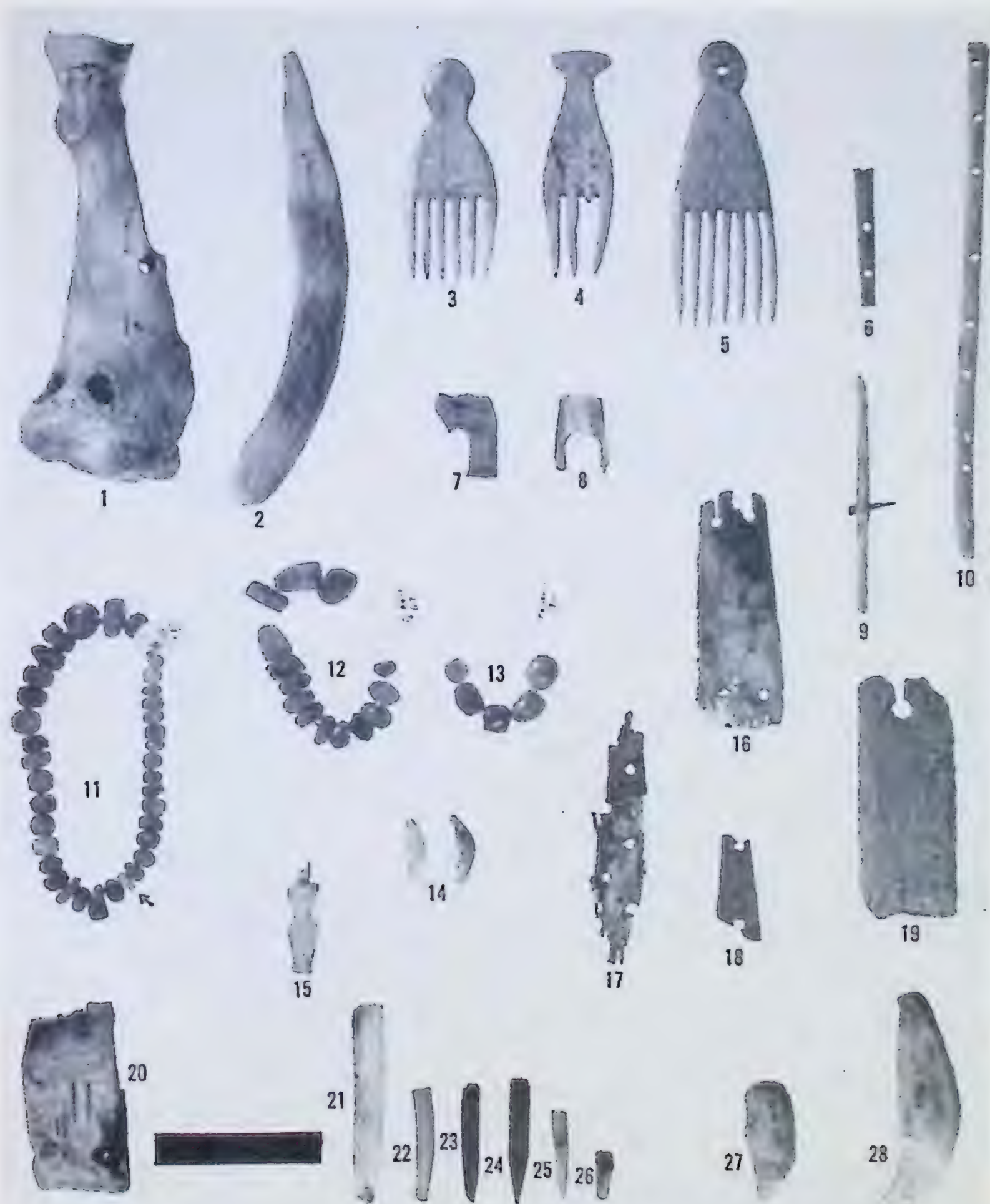


PLATE XIV

- Fig. 1. Part of seal or snow probe with antler handle (TjAq-1-72), floor, tent ring F33, Site TjAq-1, Lonesome Creek.
- Fig. 2. Part of seal probe (TkAu-1-89), north antechamber, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 3. Broken meat stick (?) (TkAu-1-96), floor, House 2, Occupation 2, Site TkAu-1, Ruggles River.
- Fig. 4. Fragment of sled shoe (TjAq-1-82), Midden V, Site TjAq-1, Lonesome Creek.
- Fig. 5. Fragment of sled shoe (TjAq-1-20), north wall of house F2, Site TjAq-1, Lonesome Creek.
- Fig. 6. Sled shoe (TkAu-1-39), west sleeping platform, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 7. Fragment of sled shoe (TjAq-1-36), surface, Site TjAq-1, Lonesome Creek.
- Fig. 8. Fragment of sled shoe (TkAu-1-71), south wall, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 9. Chisel-ended scraper (TkAu-1-66), east cache, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 10. Antler hammer (?) (TkAu-1-54), entryway, House 2, Occupation 3, Site TkAu-1, Ruggles River.



PLATE XV

- Fig. 1. Wooden bowl, or meat tray (TkAu-1-127), entryway, House 3, Site TkAu-1, Ruggles River.
- Fig. 2. Wooden bowl, or meat tray (TkAu-1-127), entryway, House 3, Site TkAu-1, Ruggles River.
- Fig. 3. Bone wedge (TkAp-1-3), surface, Site TkAp-1, Basil Norris Bay.
- Fig. 4. Kayak harpoon rest (?) (TjAq-1-47) outside of tent ring F33, Site TjAq-1, Lonesome Creek.
- Fig. 5. Wooden pail rim (TkAu-1-11) floor, House 2, Occupation 1, Site TkAu-1, Ruggles River.
- Fig. 6. Antler side scraper (TlAu-3-2), surface, Site TlAu-3, Boat Haul Site.
- Fig. 7. Fragment of harpoon shaft (TjAq-1-76), surface, tent ring F31, Site TjAq-1, Lonesome Creek.
- Fig. 8. Antler side scraper (TjAq-1-34), outside of House F11, Site TjAq-1, Lonesome Creek.
- Fig. 9. Unidentified wooden object (TjAq-1-62), tent ring F33, Site TjAq-1, Lonesome Creek.
- Fig. 10. Marline spike (?) (TkAu-1-27), floor, House 2, Occupation 2, Site TkAu-1, Ruggles River.
- Fig. 11. Chert hand drill (?) (TjAq-1-4), floor of windbreak F1, Site TjAq-1, Lonesome Creek.
- Fig. 12. Chert end scraper (TlAt-1-1), floor of House F3, Site TlAt-1, west side of Gilman Delta.
- Fig. 13. Unidentified ivory object (TkAu-1-27) floor, House 2, Occupation 2, Site TkAu-1, Ruggles River.
- Fig. 14. Quartz crystal graver (TjAq-1-3) surface, Midden V, Site TjAq-1, Lonesome Creek.
- Fig. 15. Quartz crystal graver (TjAq-1-1) surface, Midden V, Site TjAq-1, Lonesome Creek.



PLATE XVI

- Fig. 1. Soapstone lamp with wick ledge (TjAq-2-1), surface, Site TjAq-2, Conybeare Bay.
- Fig. 2. Patch for broken end of lamp (TjAq-2a), surface, Site TjAq-2, Conybeare Bay.
- Fig. 3. Rectangular soapstone bowl (TkAu-1-52), entryway and north alcove, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 4. Soapstone sherd (TjAq-1-23), surface, Midden V, Site TjAq-1, Lonesome Creek.
- Fig. 5. Soapstone lamp patch (?) (TkAu-1-60), entryway, House 2, Occupation 3, Site TkAu-1, Ruggles River.
- Fig. 6. Soapstone lamp patch (TkAu-1-21), floor of storage locker, House 2, Occupation 1, Site TkAu-1, Ruggles River.

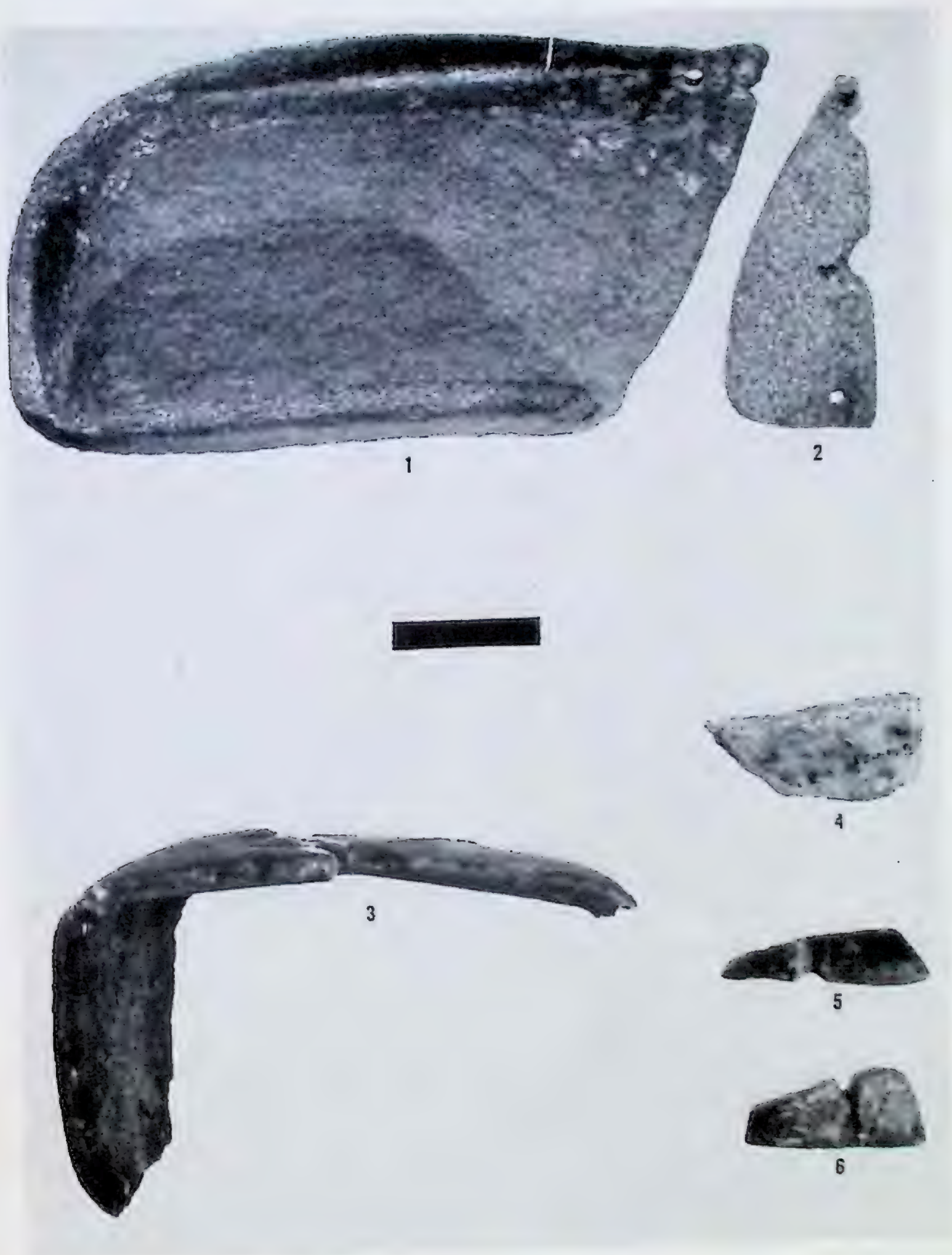


PLATE XVII

Fig. 1-15. Wood fragments and artifacts, mainly unidentified, from the surface of Site TjAq-1, Lonesome Creek.



